AMERICAN ARTISAN

WARM AIR HEATING • SHEET METAL
CONTRACTING • AIR CONDITIONING

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ABLISHED
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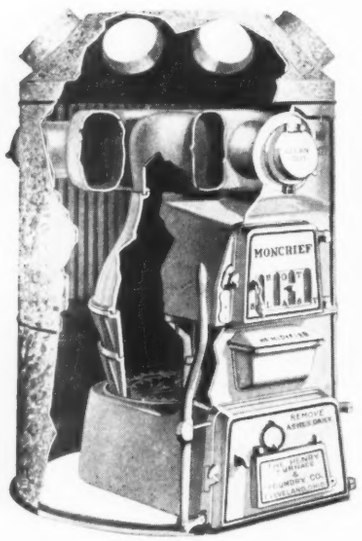
JANUARY 18, 1932

Worth *More* Than They Cost



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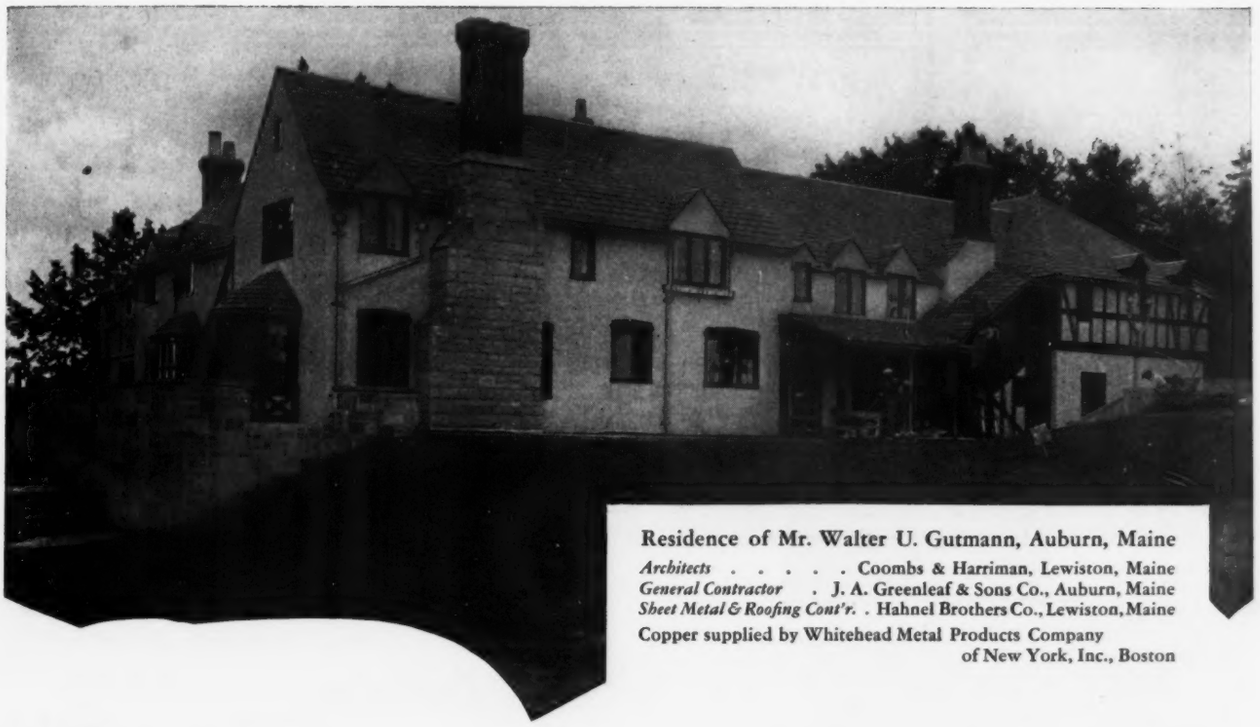

Residence of Mr. Walter U. Gutmann, Auburn, Maine
Architects . . . . . Coombs & Harriman, Lewiston, Maine
General Contractor . J. A. Greenleaf & Sons Co., Auburn, Maine
Sheet Metal & Roofing Cont'r. . Hahnel Brothers Co., Lewiston, Maine
Copper supplied by Whitehead Metal Products Company of New York, Inc., Boston

6,000 lbs. of Anaconda Copper protects this home from Rust

SHEET METAL WORK for the palatial residence of Mr. Walter U. Gutmann, though it required over 3 tons of Anaconda Copper, was just another job for Hahnel Brothers Company of Lewiston, Maine—one of the foremost contractors in the North Atlantic section of the United States. Says Oscar R. Hahnel, President:

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For jobs big or small, you too can rely on Anaconda Copper. It is supplied promptly . . . in sheets, rolls and Economy Strips and in gutters, rain-pipes, elbows and shoes stamped "Anaconda" . . . by leading distributors in principal cities.

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Architect: Jens Frederick Larsen *General Contractor:* Hegeman-Harris

Staff of Hahnel Brothers Co. *Left to right*—Oscar R. Hahnel, *Pres.;* Henry Hoffman, *Shop Supt.;* Emil H. Schott, *Ass't. Mgr.;* Emil G. Hahnel, *Treas. & Mgr.*

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AMERICAN ARTISAN

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Gravity Warm Air Heating
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Sheet Metal Contracting
Air Conditioning
Industrial Roofing
Merchandising
Ventilating

JANUARY 18, 1932

VOL. 101, NO. 2

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Published Every Other Monday

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Porter-Spofford-Langtry Corp.

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Chicago
Central 7670

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New York Office
Room 1109
295 Madison Ave.
Ashland 4-5342

Yearly Subscription Price—In United States, $2.00; Canada (including duty), $4.30; Foreign, $4.00; Single Copies, $.25.

Founded 1880

J. D. Wilder
Editor

Platte Overton
Engineering Editor

Entered as second-class matter, January 29, 1930, at the Post Office at Chicago, Illinois, under the act of March 3, 1879. Formerly entered on June 25, 1887, as American Artisan and Hardware Record

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a VALUE that CHALLENGES COMPETITION

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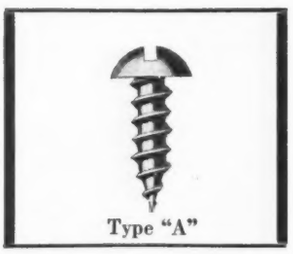

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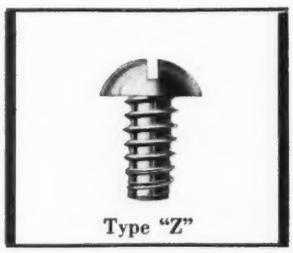

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Hardened Screwnails — make it unnecessary to use costly wood screws where a secure sheet metal to wood fastening is required. Driven like nails, yet hold 4 times better.

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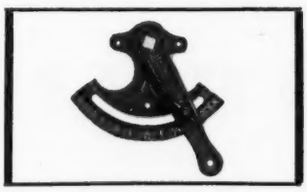
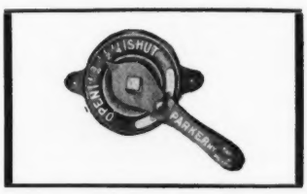


Hyro Damper Quadrant — the standard and most efficient damper control. Easily and quickly attached to round or rectangular ducts.



Hyro Dial Damper Regulator — An inexpensive and greatly favored device for controlling small dampers.

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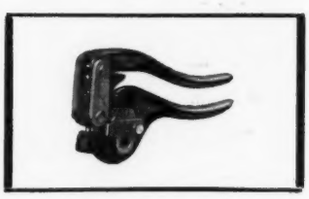
Hyro Shur-Grip Handle for solder irons . . . screws on and stays on . . . outlasts a dozen ordinary handles.



Hyro O. X. Metal Punch is the handiest tool a sheet metal worker can have. Has greater power than any punch of its size — capacity of ¼ in. holes in 14 gauge steel, or equal.

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True Talks
with successful sheet metal men

SERIES No. 2 **NUMBER 1**

MONEL METAL JOBS KEEP CHICAGO MONEL METAL BOOSTER BUSY

The Groen Manufacturing Company plant at Chicago, Ill.

IT didn't take long for the Groen Manufacturing Co. of Chicago to discover the possibilities of Monel Metal! It was still a comparatively young material when this enterprising mid-western sheet metal firm began to fashion it into equipment which proved highly satisfactory to customers and profitable to Groen.

For the past several years, this progressive fabricator has devoted considerable time and effort to Monel Metal work, with the result that they have a true appreciation of this silvery material's suitability for a wide variety of sheet metal products.

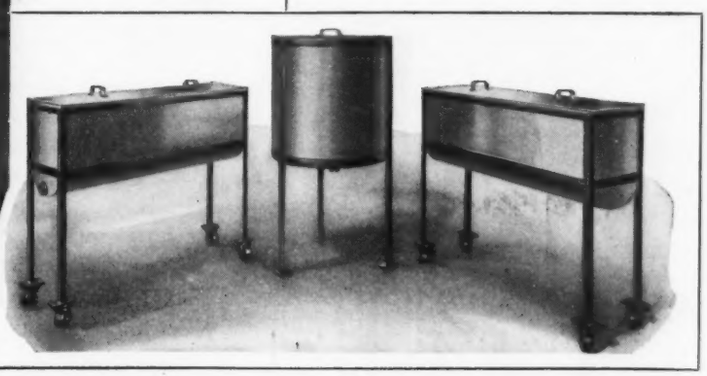
Soldered Monel Metal measures made for the Wander Co. by Groen Mfg. Co.

The Groen Company has been especially successful in constructing Monel Metal equipment for manufacturers of pharmaceutical and proprietary products. The widespread use of Monel Metal by Groen emphasizes the versatility of this modern material. The company has found that Monel Metal equipment best meets its customers' demand for cleanability and durability because it combines rust-immunity and high corrosion-resistance with a solid, chip-proof structure and steel-like strength. Groen's Monel Metal equipment has been a great asset to manufacturers of medicinal preparations because its inherent cleanliness safeguards product purity and its great durability reduces repair and replacement costs.

The Groen Manufacturing Co. has made money on its Monel Metal work and there is no reason why *you* should not do the same. Profitable Monel Metal business means satisfied customers as well. Write for more complete information about Monel Metal and about our special sales literature prepared for your use.

LEFT: *A 100-gallon mixing and holding tank for health remedies, constructed of Monel Metal and made by the Groen Mfg. Co.*

BELOW: *Monel Metal experimental tanks used by the Wander Company, Villa Park, Ill., manufacturers of Ovaltine*



ATTEND the annual convention of the National Association of Sheet Metal Contractors at Louisville, Kentucky, week of January 25, 1932. Be sure to visit our booths Nos. 5 and 6.

Monel Metal is a registered trade mark applied to a technically controlled nickel-copper alloy of high nickel content. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

A HIGH NICKEL ALLOY

MONEL METAL

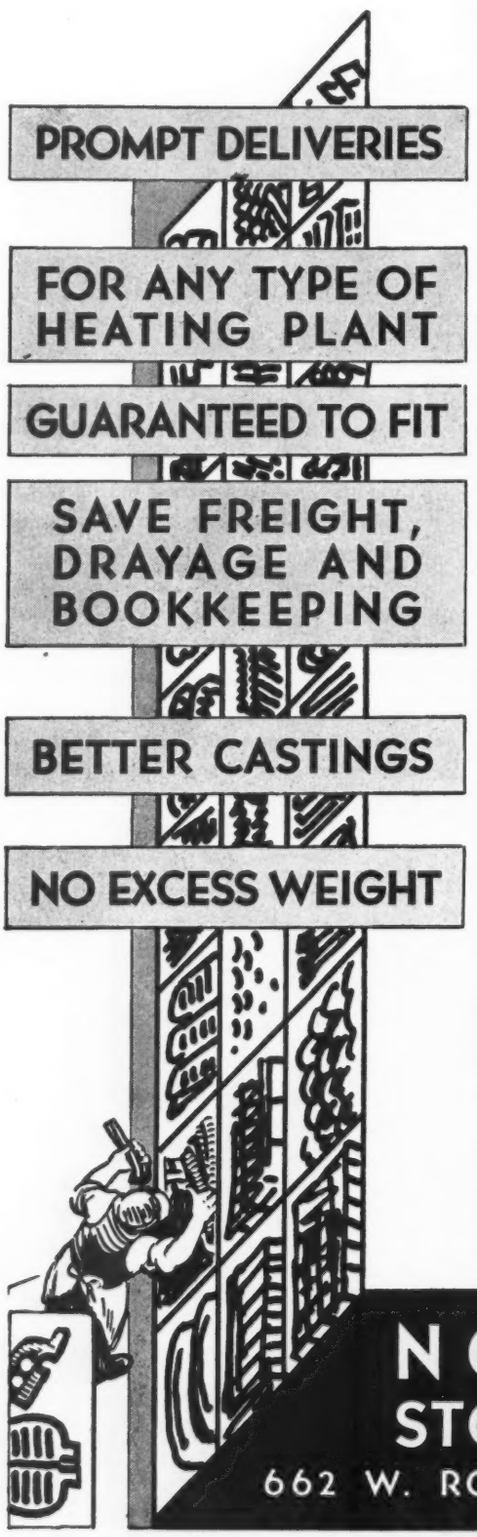
NICKEL ALLOYS PERFORM BETTER LONGER

INCO MONEL METAL

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

Say you saw it in AMERICAN ARTISAN—Thank you!

In Buying Heating Plant Repair Parts are you taking advantage of all your opportunities?



THE dealer handling furnace, stove and boiler repair parts cannot afford to overlook any of the following factors:

YOU do not have to wait three or four weeks for the repair parts you order. Our Chicago foundries carry over 300,000 patterns and keep pattern makers busy at all times adding to this list. The 60,000 bins in our warehouses are always adequately stocked with parts ready to ship.

IT MAKES no difference whether you need a part for a current model or for one that has long been obsolete. You can depend on the prompt shipment of your order for any stove, furnace, boiler or heater part regardless of make or age.

EVERY repair part made in our foundries is made from first class pattern equipment and guaranteed to fit.

BY DEALING with one house for all your repair parts you make several important savings. You write one order instead of many, receive one large shipment instead of several small ones at different times. You get whatever advantage applies in better freight rates on the larger shipment and your shipment originates at a central point that has the best railroad facilities in the United States. You pay the drayage on just one shipment instead of many, you check just one bill and you write just one check.

OUR castings, which meet the United States War Department specifications for stove plate, are first grade heat resisting metal consistently held to a standard analysis. All castings are clean and smooth.

EVERY casting is kept as light as the service for which it is designed will permit. Consequently the cost of these better castings is considerably less on a piece basis than those of inferior metal which must be given greater weight.

EVERY casting passing through our Shipping Department has pasted on it a label that shows the stove, furnace or heater for which it is intended. Your Receiving Department is therefore able to route each part promptly to the job for which it was ordered.

WHEN you deal with the Northwestern Stove Repair Company, you enjoy the complete cooperation of an organization which has specialized in the manufacture and supply of repair parts for more than 60 years and which is now the largest concern of its kind in the country.

NORTHWESTERN STOVE REPAIR COMPANY
662 W. ROOSEVELT ROAD · CHICAGO ·

Say you saw it in AMERICAN ARTISAN—Thank you!

AMERICAN ARTISAN

VOLUME 101 NUMBER 2

WARM AIR HEATING • SHEET METAL CONTRACTING • AIR CONDITIONING

Sidelights of the Depression

EVERY so often there comes to the editor's desk information which does not strictly fall within the editorial scope of this publication, but which is, notwithstanding, of importance.

Just such information recently received outlines an interesting sidelight of the depression. This information explains several points about the financial troubles of today. For what value there is in this information we pass it along for your consideration.

Most of us know that our governments, local, state and national, are in hot water over reduced income. Most of us also know that much of this present trouble has its roots in the unwillingness of public officials to realize that money today is not so easy to get as it was a few short years ago. Yet in spite of this condition, public officials are seemingly determined to spend just as they always have. In this determination to hide their eyes to present conditions lies, perhaps, some of the reasons for our present lack of money.

The article referred to says "Easy money, reckless spending and heavy borrowing in flush years have left indulging governments in a state of actual or imminent bankruptcy. In the last five years at least 165 political districts of one size or another have defaulted on either interest or principal or both of their bond issues. Cities have led the parade. From the largest to the smallest and from one end of the country to the other, these governments have led the way into bankruptcy. Counties, districts, all sorts of political tax raising subdivisions have followed suit.

"There have been defaults on water district bonds, sewer bonds, road and street bonds, educational district bonds, improvement district bonds, in short, bonds of districts of all sorts and sizes. The picture is blacker when we realize that literally hundreds of taxing districts or organizations have prevented default solely by frantically raising short term loans at high interest rates, without knowing how these short term loans will ever be paid up. The bankruptcy of such districts is imminent."

Equally interesting is a recent record of public bond issues. In the last four months of 1931—September, October, November, December—the investing public said "No, thanks" to eighty issues of municipal bonds totaling more than $88,000,000. The expenditure of this vast sum of money had been definitely decided upon by the states, cities and districts. The issues had been duly authorized—but no buyer appeared.

In flush years the authorization of these issues was followed up by merely sitting back and accepting the best offer for the issue. Now some of these political districts have tried once, twice, some three and four times to find a buyer and have failed.

The buying public simply doesn't want uncertain political bonds.

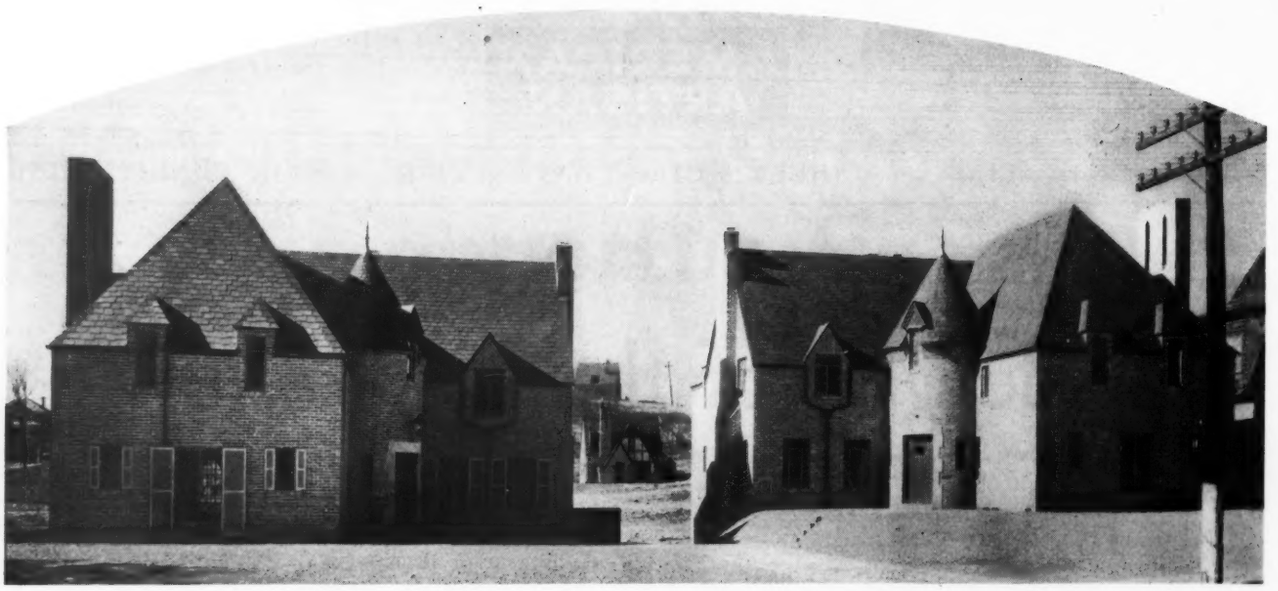
These two situations coupled together explain one cause of the depression. We as a nation have permitted our local political organizations to spend far more money than could be raised to pay off such obligations. The result is that millions of dollars of taxpayers' money are tied up in investments which must be laid away until later years for payment or actually scratched off the books.

When these millions of dollars of thoughtfully invested funds are added to the millions of dollars lost in speculation, some evidence of why the home owner "can't buy" becomes apparent. Buyer's strike is not simply a mental condition. People, those folks who are ordinarily the saving, thoughtful, investing citizens are hard pinched to find ready cash.

When these millions of citizens can't find money to buy goods, then industry all up and down the line suffers. Factories shut down, retail houses suffer sharp decreases in trade, men are laid off, and conditions as they are today come into existence.

Someone said the other day, we ought to make the biggest and stiffest broom man ever conceived and begin a general house cleaning. This cleaning ought to begin inside the political arena. We have far too much politics. We are being gagged and tied around with political interference. Soon we won't be able to breathe without official authorization.

Perhaps in this political bankruptcy we may find some answer to the frequently put question—"Why won't the public buy?"



Here are two of the two-family "different type of home" which the Rousseau firm built for sale under 1931 conditions. Air conditioning was made the feature around which these houses were built and sold

This Air Conditioning System Sells Homes in Spite of 1931 Conditions

By **HARRY L. DRAPER**
(Photographs by Frederick G. Hartz)

NOTHING that has ever been developed in the history of our country has such a wide public appeal as conditioned-air for homes—nothing will help the speculative builder in his efforts to find a buyer quite so much as a good conditioned-air plant properly designed and installed—nothing will help the sheet metal and heating shop and the speculative builder as their co-operative effort to publicize this wonderful comfort we have to offer.

If you think these statements are too strong, too positive, consider for a moment the attitude that builders in general held in the earlier stages of the electrical refrigerator's development. You probably know that it was like "pulling eye teeth" to get a building operator to consider automatic refrigeration as recently as five years back. Contrast that attitude with the present where we find practically every worthwhile apartment and most of the better homes filtted out with automatic refrigerators sold as a "part of the building."

So it is with conditioned-air equipment—there are some (many more than most of us think there are) who will gladly entertain any suggestion which will help them build better and more easily sold homes and apartments.

If you want proof of these statements, consider the case of S. L. R. Rousseau, a builder who has been in the building and general contracting business for a period of twenty-six years. In addition to having been in business many years for himself, he has been an officer in some of America's largest building firms, doing business all over the United States, and during this time has had ample opportunity to study the trend of public taste and preference.

Some years back, Mr. Rousseau's son, M. A. Rousseau, entered the business with his father. For several years past they have specialized in building homes of the better and more beautiful kind, homes that would sell because they were the kind that people want.

In the early summer of this year, Mr. Rousseau and his son decided upon a building program to cover a period of several years. The basic idea was to build "a different type of home"—something out of the ordinary in the way of beauty and general all-around desirability. Anyone will quickly realize that this was a very serious move in 1931—as Mr. Rousseau said—"We simply must develop new and better ideas to build into these homes—we must give greater value than ever before in our business life and, above all, we must build homes which people are going to want; no idea will be adopted because of its mere newness, but on the other hand, everything we decide to use must be thoroughly good in every way."

These "different homes" are of the two-family type, architecturally good and having inside and out the best equipment on the market. The feature chosen for publicizing was air conditioning, of really 1932 design and possessing truly outstanding characteristics.

Round Oak gas-fired furnaces were selected for these houses together with a Brundage air washer blower with a sufficient space between the blower and furnace to incorporate a space for ice in the connecting duct.

It was decided to use the ice space after an investigation of local weather conditions revealed that there were about ten days per year when the top temperature of the water was less than twenty degrees below the average air temperature in the city and on these ten days, the water would add to the humidity and be of no perceptible benefit in cooling. This ice space will hold about three hundred pounds of ice and at the prevailing rate in this city, the total cost of the ice per year (for the ten days mentioned) will be less than the interest and depreciation charge on refrigerating equipment for the homes.

A complete trunk line system was worked out to cover the entire installation. A special feature of this trunk system was the method of taking care of the "Tower Room," by either one of the conditioned air units installed in each building, so that which ever family decides to use the tower room as a part of their permanent home, that room can be heated by the unit used by that family.

The idea of major importance in these homes is that of making it possible for one to purchase the entire home and rent out the other section. There are two complete homes in each house and one may "carry" the whole financial obligation on the income received from "renting out one side." This fact received due consideration when fuel was discussed and, as gas is cheap in the Pittsburgh sector, it was held that the "renter" would rather have gas than solid or liquid fuel.

Perhaps the outstanding feature of this installation is that it is almost completely automatic. There are only two manual operations per year to completely govern the heating and cooling operations—these consist of turning off the pilot in the summer time and turning it on in the early fall.

There are two thermostats in each home—one upstairs for nighttime control and one downstairs to boss

The air conditioning system is a model of compactness, attractiveness and effectiveness. The walls of the heater room are tinted a light brown while the furnace, blower, washer and the ducts are green with red trim on the furnace and blower. The ice chamber is the section of return duct between the blower and the furnace. Note the special basement heating grille and controls

the job during the day. These thermostats are connected with a General Electric time clock and Minneapolis-Honeywell relay and the operation of the entire system is governed, as far as heating and cooling is concerned, by these instruments. The humidity is controlled by a Lewis Humitrol in connection with an Arco solenoid valve on the water line of the washer.

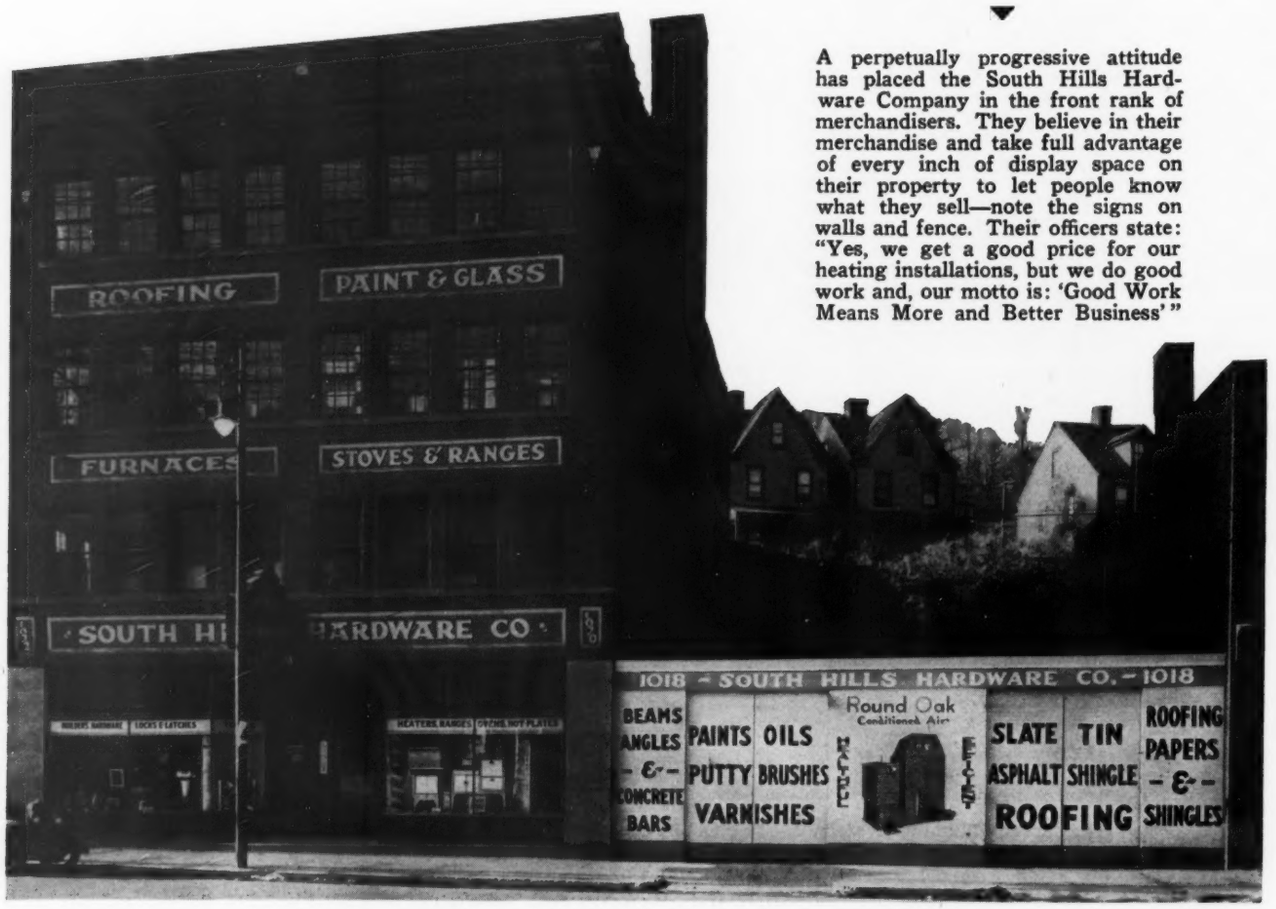
The furnace is equipped with a "main" burner, also an auxiliary burner, which is used to keep the body of the furnace warm whenever the main burner is off, and it was Mr. Rousseau's idea that the auxiliary burner could be pressed into added service by mounting a special electric valve on the feed line, which would serve to keep the temperature within finer limits than is ordinarily the case on even a "gas-fired job."

Perhaps the best way to make this clear to you is to tell how this unusual control system works. Here is the story in Mr. Rousseau's own words:

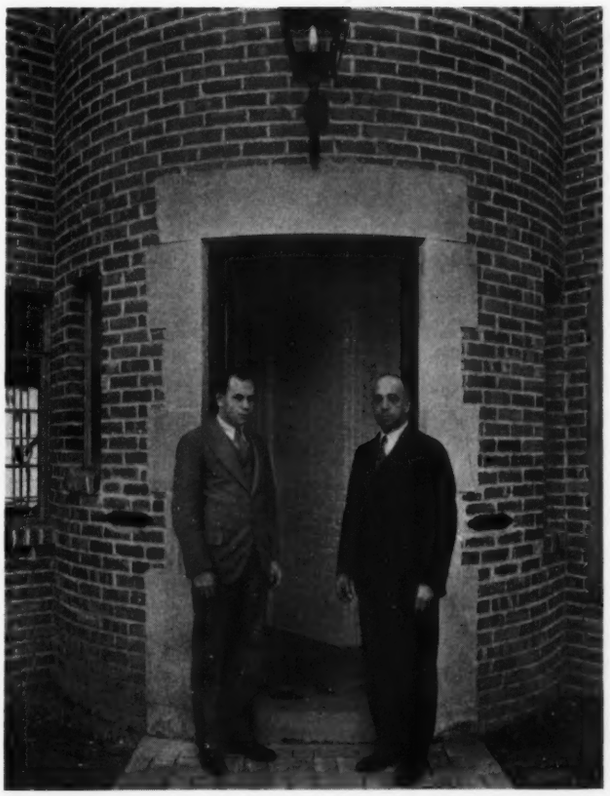
"I have designed the system to maintain a 'heating' temperature of 70 degrees and a cooling temperature of 75 degrees. Here is how it works: When the temperature of the home drops to 69½ degrees, the auxiliary burner turns on and provides a small amount of heat, in addition to keeping the furnace body warm. Let us assume that it gets colder and the auxiliary burner is unable to keep up temperature. In this case, the main burner turns on when the home temperature lowers to 68½ degrees; it will continue to burn until the temperature is raised to 69½ degrees, at which time it goes off, permitting the auxiliary burner to maintain the heat. If, and in the event the temperature reaches 70½ degrees, the auxiliary burner is turned off and will stay off until a temperature of 69½ degrees is in effect.

"With cooling, when the temperature of the home reaches 75 degrees, a water spray of 35 gallons per hour is started through the air washer. In addition to this, the blower automatically starts to operate at high speed which, with the cooling effect of the water and the movement of a large volume of air, creates the desired drop in temperature and, in addition, provides an abundance of freshly cleansed air.

"During the periods of widely varying temperatures which usually obtain in the spring and fall, when one is inclined to wonder whether to turn off the heat or let it alone, I have provided that the blower shall operate at a speed which will provide two and one-half air changes per hour, as long as the auxiliary burner is in operation—this keeps up a very gentle flow of heat, which wafts through the registers with zephyr-like effect, rather than with the suffocating sensation sometimes felt when there is too great an amount of heat released for a short period, as would be the case if the main burners of a furnace would come into play for a few minutes on a relatively warm day.



A perpetually progressive attitude has placed the South Hills Hardware Company in the front rank of merchandisers. They believe in their merchandise and take full advantage of every inch of display space on their property to let people know what they sell—note the signs on walls and fence. Their officers state: "Yes, we get a good price for our heating installations, but we do good work and, our motto is: 'Good Work Means More and Better Business'"

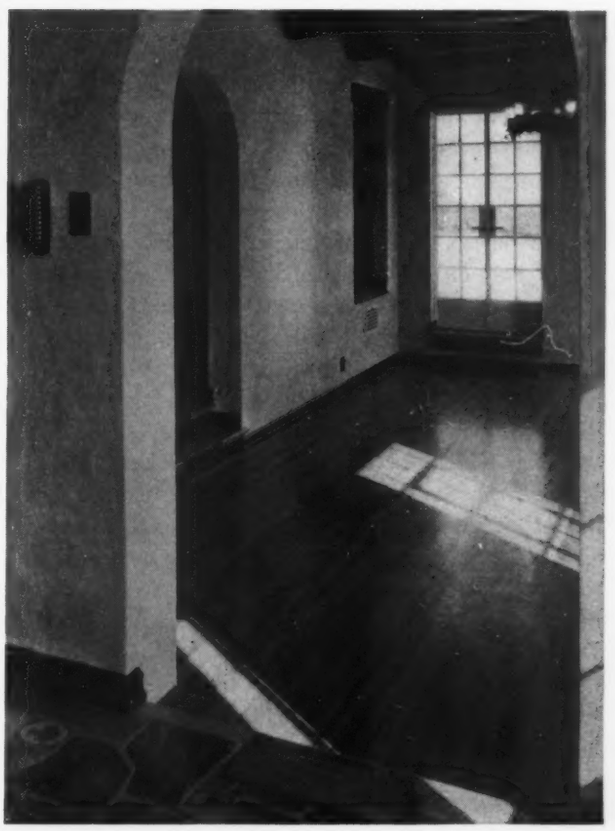


S. L. R. Rousseau on the right. M. A. Rousseau, left. These men are the directing heads of the Contracting Corporation of of America. Mr. Rousseau, senior, says he has never seen or heard of anything which has as wide and strong an appeal as conditioned air for the home

"When the bonnet temperature reaches 160 degrees, whether due to the auxiliary burner or main burner (or both) being in operation, the blower automatically provides an air change of 6 per hour, and when the system calls for cooling, the blower automatically produces 12 air changes per hour."

The most interesting detail of this merchandising co-operation is this—it was Mr. M. A. Rousseau who outlined what he wanted. It was he who laid down the specifications to follow. The dealer did not sell him a thing—he bought what he wanted and he knew as much (and maybe more) about conditioned air as we did when we started the job, and at this time probably knows a great deal more about its possibilities than most dealers even dream of.

The contractor on this installation, the South Hills Hardware Co., deserves a world of praise. If they had been unable to lay out the duct work and plan the layout of the entire installation in such a way as to make possible a rare blend of beauty, practicability and economical operation and it is only fair to say that the whole thing would probably have fallen flat—there just wouldn't have been any installation.



An interior view in the dining room, looking toward the front of the home. Both temperature and humidity control are located in a conveniently reached position. The humidity control can be made one of the great innovations in American home building for it instantly catches and holds the interest of the prospect

The photographs show some of the ingenious details of the duct work—how they have been worked around and under obstructions, how the basement outlets have been arranged, the placing of the quadrants, the way the transition of one of the main ducts was handled.

In order to take care of an extra large volume of air movement for summer use, all ducts are made twenty per cent oversize. All are held in place with heavy strap iron and they will support the weight of half a dozen two hundred-pound men. The quality and beauty of this duct work has excited the favorable and enthusiastic comment of every mechanic on the job. Even the plumber-master, who has put in hundreds of steam and hot water plants, is "sold" on the installation and, if that's not real praise, what is?

Why did the Contracting Corporation of America decide to use conditioned air in their new home building program? Answer: Because they were sure in their own minds that by so doing, their homes would have a wider and stronger public appeal and, as a result, would find a more ready market.

These builders have found that the conditioned air plants installed in these jobs have fully met their expectations. These homes were completely finished with no advertising whatsoever, other than the talk of the workmen on the oper-

(Continued on page 21)

Intersecting Cones and Frustrums

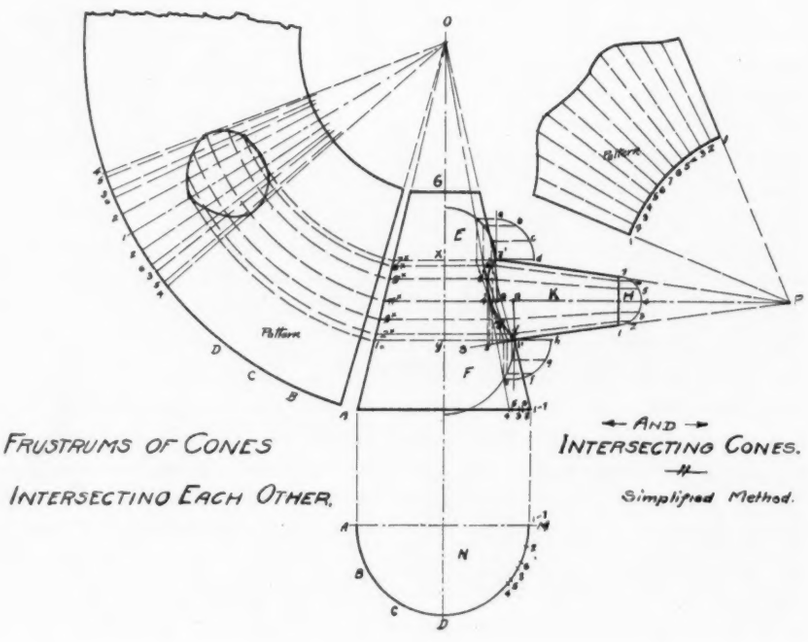
By L. F. HYATT
Contributing Editor

THE problem of developing patterns for intersecting cones and frustums of cones is confusing, and requires a somewhat lengthy procedure if done by the usual method.

The method used here is simpler and more easily understood. Begin by drawing the vertical center lines *O-D*, also the horizontal center line *A-M*. With the point of intersection of these two lines as a center draw the half circle *N* representing the half of the large frustums of a cone. A suitable distance from the horizontal center line draw another horizontal line representing the base of the elevation view. Project vertical lines from points *A* and *M* intersecting the horizontal line just drawn. Next locate point *G* and draw a horizontal line through this point. Step off a distance each side of the point of intersection equal to the radius of the small end. Now draw the lines from the base, through the points just located to the point of intersection of these two lines with the center line at *O*. Next draw the horizontal center line of *K*, lettered *P-4*, and the half circle *H* the size of the small end of the small frustums, at the desired distance from the large frustum. Divide this half circle and draw lines from *P* through 1 and 7 intersecting the large frustum locating 1′ and 7′. Now draw a vertical line and a horizontal line through points 1 and 7, and draw the half circles the radius of which are taken from points 1 to center line, point *n*, and from 7′ to *o*. Now divide the quarter circles into three equal parts as shown and draw horizontal lines intersecting quarter circles *E* and *F*. From the points of intersection draw vertical lines intersecting the horizontal lines on the elevation drawn from 1′ and 7′. Connect like points from *E* with those of *F* with sloping lines as shown. Now draw horizontal lines from the points on the half circle representing the small end of the small frustum intersecting the vertical line 1-7, representing the diameter of the end. Now from point *P* draw lines of indefinite length through the different points of intersection allowing them to intersect the sloping lines locating points 1′, 2′, 3′, 4′, 5′, 6′, through which the line of intersection may be drawn.

Now from the apex *O* draw lines through each of the points on the line of intersection. Allow them to intersect the base. Only one of these lines has been drawn. Now drop lines from each of these points to the half circle representing the base. With *O* as a center and *O-A* as a radius draw an arc and step off twelve spaces equal to one of the spaces, as *A* to *B* found on the half circle *N*. Next draw the arc representing the upper end of the frustum. Midway between the two ends draw the center line 1-*O* and upon the large arc step off the distance 1 to 2, 2 to 6, 6 to 3, etc., found on *N* and from each of these points draw lines to apex *O*. Now from each of the points 1′, 2′, 3′, etc., on the elevation draw the horizontal lines intersecting the sloping line on the left side of the elevation view, locating *1x, 2x, 3x,* etc., and with radii equal to these distances *O* to *7x, 6x,* etc., draw arcs intersecting the lines just drawn from *O* to the large arc. Through the points of intersection draw the opening in the large frustum. One side of the pattern for the large frustum is shown broken because of lack of space.

To develop the pattern for *K* strike an arc the radius of which is equal in length to *P-7* and upon this arc step off and number 12 spaces found on the half profile *H*. From *P* draw lines through each of these points. Now extend the line *P* to 1′ to *S* and drop vertical lines from 1′, 2′, 3′, etc., allowing them to intersect the line just extended. Only one of these points has been numbered, to avoid confusion. The lengths on this line are the true lengths of the lines on the small frustums. With the length found here strike arcs intersecting the lines radiating from point *P* of like numbers. Through these points draw the curved line, thus completing the pattern. This method may be used when a cylinder intersects the frustum, or regardless of the angle of the small frustum.



FRUSTRUMS OF CONES INTERSECTING EACH OTHER.

← AND → INTERSECTING CONES.
Simplified Method.

AIR CONDITIONING

Beginning with this issue, American Artisan devotes a definite section of the paper to the problems of Air Conditioning. In this section, which will be marked for your convenience with the corner markers used on this page, we will publish authoritative articles on all phases of this important subject. These articles will be written by men of standing in their special fields. So far as possible, each group of articles will be begun and run during the months of the year when that particular problem is most acute. All highly technical information will be explained in language we can all understand and apply.

THE EDITORS

Fundamental Principles of Air Properties

TO DEFINE "Air Conditioning" we may say that the term carries its own definition. However, there are several various applications possible in conditioning. Whenever we change the temperature of air or add vapor or remove dust, etc., for any purpose, we may say we are conditioning it.

The term here used will apply to the conditioning of air for homes and public buildings, or wherever people live or congregate inside of buildings, such as a factory, office, store, church or theater.

We may say that air conditioning is the production and maintenance of atmospheric conditions conducive to health and comfort indoors. This condition of the atmosphere is maintained by the constant supply of air through inlets. The air is exhausted through outlets and returned to the air conditioning apparatus in the basement or wherever it is located. It will be observed that air is the medium on which the various factors of air conditioning are carried, such as humidity, heat, etc.

Regarding air we may describe it briefly as a perfect gas containing oxygen, nitrogen, some carbon dioxide (CO_2), and water vapor. Ordinary dry air is composed as follows, in per cent:

	By volume	By weight
Oxygen	20.9	23.1
Nitrogen	79.1	76.9

Air expands when we heat it and contracts when it is cooled. It absorbs heat as it passes over the surfaces of a heater and gives up or releases this heat as it cools in the room served. As we heat it, it also absorbs moisture from the humidifying apparatus and carries this vapor into the room. This medium (air) also carries dust which should be removed by filters, washers or other cleaning devices.

The density (weight) of air per cubic foot varies with the temperature, also with the barometric pressure. Thus a cubic foot of air at 70 degrees will weigh less in Denver, Colorado, than it will at New Orleans or at sea level.

Water vapor will also affect the weight. Air fully saturated with moisture will weigh more than a cubic foot of dry air at the same temperature and pressure. Various tables showing the properties of air will be given as we proceed with the air conditioning problems.

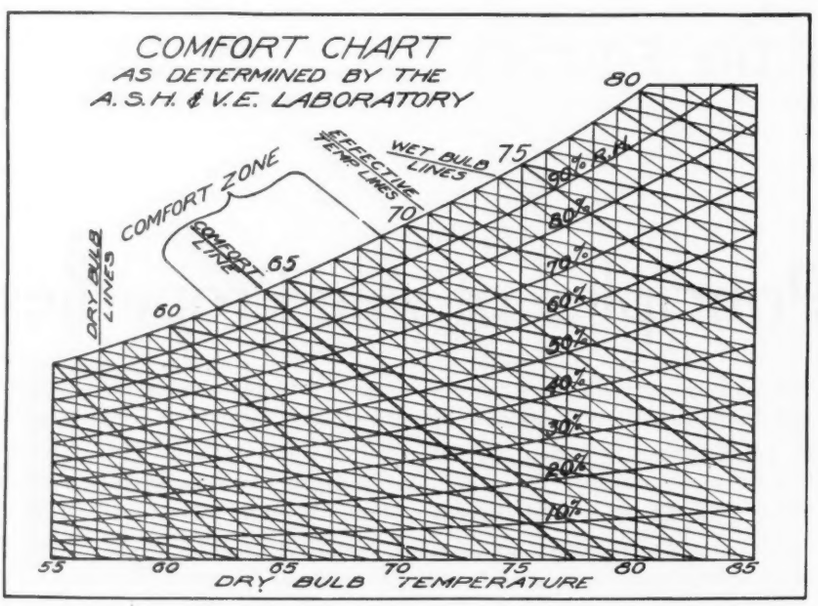
The important points for the proper atmospheric conditions may be said to be temperature control, humidity and humidity control, cleanliness and a constant circulation.

Temperature or heating of air may be said to be the one item of the four easy to maintain. We have only to provide a heater and force the air over it. Temperature control necessitates the application of

intricate controls and good design. Humidity and humidity control is vastly important. Existence of a *proper* amount of moisture in the atmosphere is essential to comfort and health both of plants and animals. Too much humidity is about as uncomfortable as too little. In some manufacturing processes a definite humidity is important. For comfort we may say roughly that the higher the temperature the lower the humidity should be, and vice versa. This relation of temperature and humidity will be observed on the pyschrometric chart. The shaded area is the comfort zone. If we locate 65 degrees on the dry bulb temperature line and follow perpendicularly untitl we intersect with the comfort line we find we fall on the 90 per cent relative humidity line. Now locate 75 degrees on the dry bulb line and observe that it crosses the comfort line on the 15 per cent relative humidity line. We experience the same comfort at both temperatures if the relative humidity shown is maintained.

We must bear in mind that this comfort line is based on the normal healthy person. With unhealthy people suffering from high blood pressure or rheumatism, etc., the case becomes physiological and temperature and humidity may be varied from the above chart to suit the case.

To those who do not understand the chart, we will explain how to determine the relative humidity of any room or space. If no wet and dry bulb thermometer is handy, obtain two fairly accurate thermometers and place them side by side. Around the mercury bulb of one wrap a small piece of cloth and saturate this cloth with water at room temperature. Now fan the wet bulb briskly with a fan or paper until the mercury drops as far as it will go. Now locate this temperature on the chart on the wet bulb line and follow the diagonal line until intersecting with the dry bulb lines from the base of the chart. On the curved lines the relative humidity will be shown. Example—Wet bulb temperature reads 65 degrees. Dry bulb temperature shows 72 degrees. The relative humidity is 40 per cent.



There are literally dozens of Comfort Charts. Some are simple, others require real mathematical ability to use. This is a simple one, widely recognized and suitable for the air conditioning engineer, except in unusual conditions

When we inhale air at the standard of 20 per cent oxygen and 80 per cent nitrogen we exhale 16 per cent oxygen and 75 per cent nitrogen. The remaining percentage contains carbon dioxide and vapor. The carbon dioxide increases about 100 times and for years it was supposed that exhaled air was poisonous and any air that contained this increase in carbon dioxide (CO_2) was called "impure." This is the basis of the old "30 cubic feet per person per minute" rule used in public ventilation, as it was necessary to provide this much air to keep the CO_2 content down.

We now know that CO_2 is not dangerous to health except that it reduces the oxygen by displacement.

As outside air is low in CO_2, we observe how the old-timers fell for the fallacy that "outside air is pure."

In some large cities (Chicago) and some states (Ohio) this rule of 30 c.f.m. per person with air from out of doors, called "fresh air," is maintained by law. This "pure outside fresh air" may contain the odors or smoke or fumes from factories or stockyards. It may be full of dust and germs, or the area of the outside intake piled high with vermin or dead cats, but it is from outside, hence "fresh." It may be dry as a bone or saturated with rain. but you must use it. In hundreds of systems the owners spend hundreds of dollars on weatherstrip to keep the outside air out and hundreds of dollars for fuel to take it in through the outside air intake!

Be that as it may, the average home will get sufficient outside air through leakage and infiltration.

At zero or below, air is practically dry. This is the reason the relative humidity is low in the average home in cold weather. The terms "relative humidity" and "dew point" are used frequently. We will explain them for the benefit of the unenlightened.

Humidity is expressed in two ways, "absolute humidity" and "relative humidity." The relative humidity expresses the ratio which exists between the weight of water (vapor) present in the air to the weight that would be present if the air were saturated at its actual temperature. Example—One cubic foot of air at 70 degrees will hold 7.98 grains of moisture at saturation. If we heat this cubic foot of air (fully saturated) to 80 degrees it will hold 10.933 grains of moisture, but as it

contains only 7.98, we have 7.98 ÷ 10.933 = .73, approximately, or 73 per cent "relative humidity." 7.98 and 10.933 are the "absolute humidity" for one cubic foot of air at 70 and 80 degrees respectively.

There are a number of tables showing this capacity of air to hold moisture. Not all tables agree exactly. For instance, the table shown here varies several parts of a grain from the figures just quoted. However, these differences are usually not great enough to cause trouble.

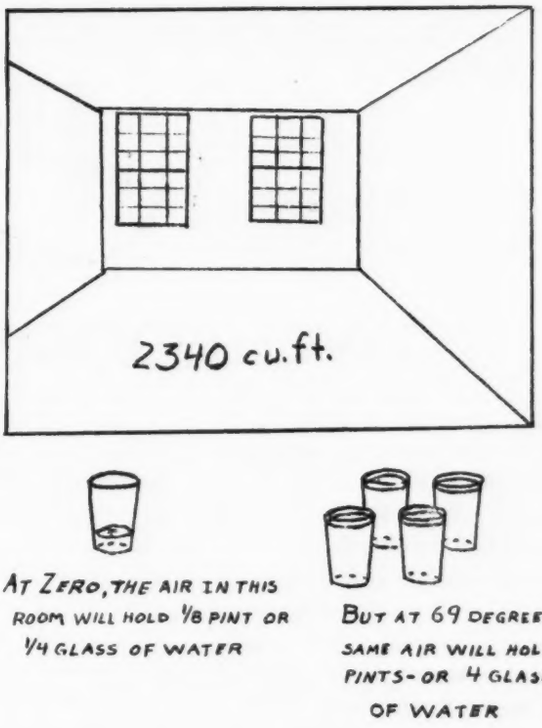
"Dew point" is the temperature of the air at which it becomes saturated, or our cubic foot of air at 80 degrees with 7.98 grains of moisture or 73 per cent relative humidity will become saturated if reduced to 70 degrees. Hence the "dew point" of air at 80 degrees with 73 per cent relative humidity is 70 degrees.

If this cubic foot of air at 70 degrees is reduced in temperature to 60 degrees we have "precipitation," as one cubic foot of air at 60 degrees saturated will hold only 5.744 grains of moisture. This moisture leaves the air in the form of frost, dew and rain out of doors, and in the house we see it on windows, the ice pitcher, or any cold surface.

HUMIDITY TABLE

Dry Bulb Temp.	Grains of Water Per Cubic Feet of Air For Relative Humidities Shown							
	10%	20%	30%	40%	50%	60%	70%	100%
-20F	0.02	0.03	0.05	0.06	0.08	0.10	0.11	0.16
-10	0.03	0.06	0.09	0.12	0.15	0.17	0.20	0.29
0	0.05	0.10	0.14	0.19	0.24	0.29	0.34	0.48
10	0.08	0.16	0.23	0.31	0.39	0.47	0.55	0.78
20	0.13	0.25	0.37	0.50	0.62	0.75	0.87	1.25
30	0.19	0.39	0.58	0.78	0.97	1.17	1.36	1.94
40	0.29	0.57	0.86	1.15	1.43	1.72	2.00	2.86
50	0.41	0.82	1.23	1.64	2.05	2.46	2.88	4.11
60	0.58	1.16	1.74	2.32	2.90	3.48	4.06	5.80
62	0.62	1.24	1.86	2.48	3.10	3.72	4.34	6.20
64	0.66	1.33	1.99	2.65	3.32	3.98	4.64	6.63
66	0.71	1.42	2.12	2.83	3.54	4.25	4.96	7.08
68	0.76	1.51	2.27	3.02	3.78	4.54	5.29	7.56
70	0.81	1.61	2.42	3.23	4.03	4.84	5.65	8.07
72	0.86	1.72	2.58	3.44	4.30	5.16	6.02	8.60
74	0.92	1.83	2.75	3.67	4.58	5.50	6.42	9.16
76	0.98	1.95	2.93	3.90	4.88	5.86	6.83	9.76
78	1.04	2.08	3.12	4.16	5.20	6.24	7.27	10.39
80	1.11	2.21	3.32	4.42	5.53	6.63	7.74	11.06

This table is one of many such showing the capacity of air to hold moisture as temperatures are raised. The readings are in grains of moisture per cubic foot


2340 cu.ft.
AT ZERO, THE AIR IN THIS ROOM WILL HOLD 1/8 PINT OR 1/4 GLASS OF WATER
BUT AT 69 DEGREES THE SAME AIR WILL HOLD 2 PINTS - OR 4 GLASSES OF WATER

Here is a typical room. If the air is zero degrees the 2340 cubic feet of air in the room can hold only one-eighth of a pint of water. Raise the temperature to 69 degrees and this same amount of air can hold two pints of water

To illustrate this capacity of air to carry increased moisture as the temperature is raised, let us assume we have a room with 2,340 cubic feet of area. At zero degrees this amount of air will hold only one-eighth of a pint of water.

If the air in this room is heated to 69 degrees, its capacity for moisture is increased so that it will hold two pints of water. If we want 50 per cent relative humidity we must have one-half this amount or one pint of moisture. If we have an outside air intake we must add seven-eighths of a pint of water every hour to maintain 50 per cent relative humidity. With only one air change per hour we must have 24 (hrs.) times 7/8 (pints) equals 21 pints or 2 5/8 gallons of water a day. This is, remember for only one room. Any small house with approximately 15,000 cubic feet will then require 16 gallons of water per 24 hours to maintain 50 per cent relative humidity.

You can compare this with the moisture producing capacity of your heating plants and ascertain about how much relative humidity, really, you are giving your customers.

Heating men, and some engineers, often seem unable to comprehend how you can add the necessary amount of moisture to the air *before* it enters the casing, then heat the air to perhaps 180 to 300 degrees and still have the humidity desired when this air enters the room.

The answer is that regardless of how much you *heat* air it maintains its ability to hold the amount of moisture it possessed before heating and to retain this amount of moisture until the air becomes cooler than it was when the moisture was added.

For instance, if you have a blower and a washer and your equipment is set to give 40 per cent relative humidity to air at 60 degrees at the blower, you put 2.90 grains of moisture in every cubic foot. You can then heat this air in the heater to 180, 200, 300, or more degrees, but you still have those 2.9 grains of moisture in every cu. ft.

It is well to remember that this physical ability of air holds good only in heating. If you cool the air below the temperature it was when you added the water, you decrease the ability of air to hold the amount of moisture and hold these 2.9 grains of water. This is why you can cool and *de-humidify* if your water in the washer *cools* the air passing through it.

. . . the problem corner

TWO ROOMS WON'T HEAT

ONE of our readers in the Southeast sends in a sketch of the heating system for a house in which there are two rooms which do not heat satisfactorily.

The installation was made in an old house. All the old registers were used and left in their original locations excepting the servant's room on the second floor, which is in an addition to the house. The original installation used all outside air, but is changed over now, to recirculation.

Here is the situation as our reader describes it.

"Enclosed is rough sketch of a job we recently installed. We had trouble with heating two rooms—the servant's on the second floor and the kitchen on the first.

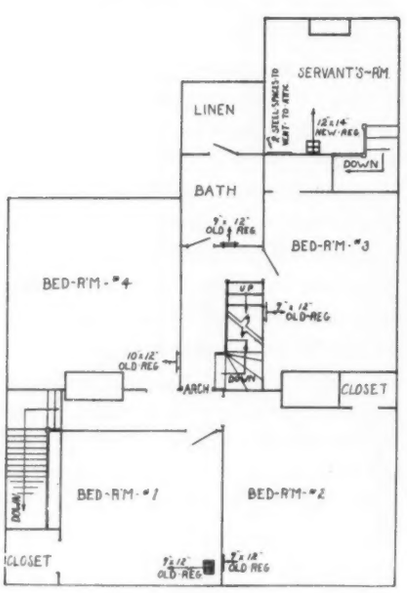
We heated the servant's room by venting to the attic, which relieved the air-bound condition. But, our customer will not leave the doors open leading from the kitchen to the nearest cold air return.

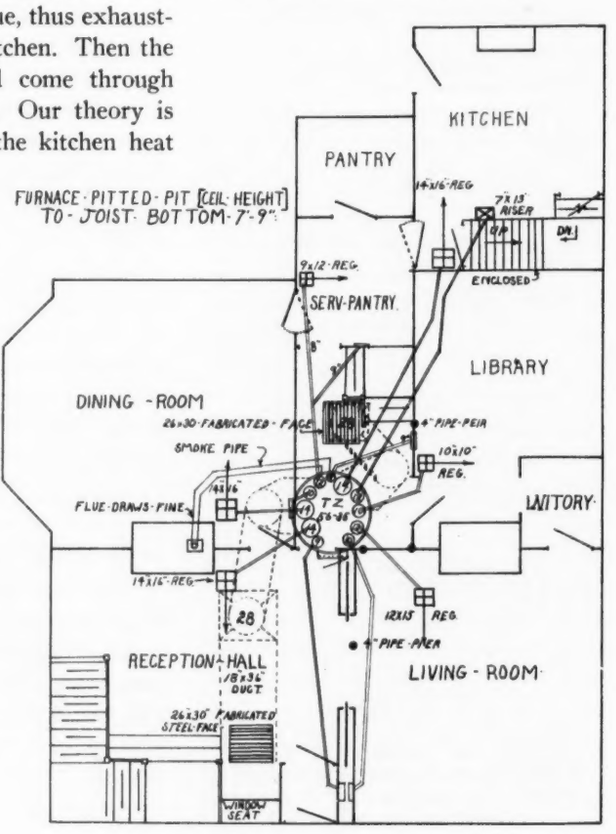
"We wanted to take air from the kitchen where the warm air register is now located, and connect to the bottom of the furnace, and place a new warm air register next to the second floor riser; but our customer objected because he does not want kitchen odors to permeate the atmosphere of the rest of the house. We were to do this without cost to our customer, but since he refuses, he must pay for any other method of relieving the air-bound condition.

"You will note that we have a possible solution drawn on the first floor plan of the sketch. We propose to use some type of individual pipe run booster inserted in an 8-in. or a 9-in. pipe raised from the floor a few inches and connected to the old kitchen range flue, thus exhausting air from the kitchen. Then the warmed air should come through the warm air duct. Our theory is that not only will the kitchen heat adequately, but that it will eliminate any and all kitchen odors getting into the rest of the house.

"Anyway, we would like to have a discussion in your good journal on this question, since the owner forbids taking return air from the kitchen, and it is impractical, or rather fairly out of the question, to vent the kitchen to the attic. We would also like to see the question of whether or not it is good practice to return air from the kitchen.

"If some of your readers have had experience with individual pipe run booster fans we would like to know whether or not they think such a fan placed in the flue mentioned would exhaust the air from the kitchen into the outside.





At the left is the second floor layout. Poor heating of the servant's room has been overcome by venting the air bound room into the attic At the right is the present layout of the kitchen. The nearest cold air is beyond a door which the owner refuses to let stay open. There is an old flue which may be used to exhaust air. How would you heat this kitchen without recirculating its air through the furnace? The kitchen is 13 x 18 x 11 feet high

Concluding the Heat Robber Problem

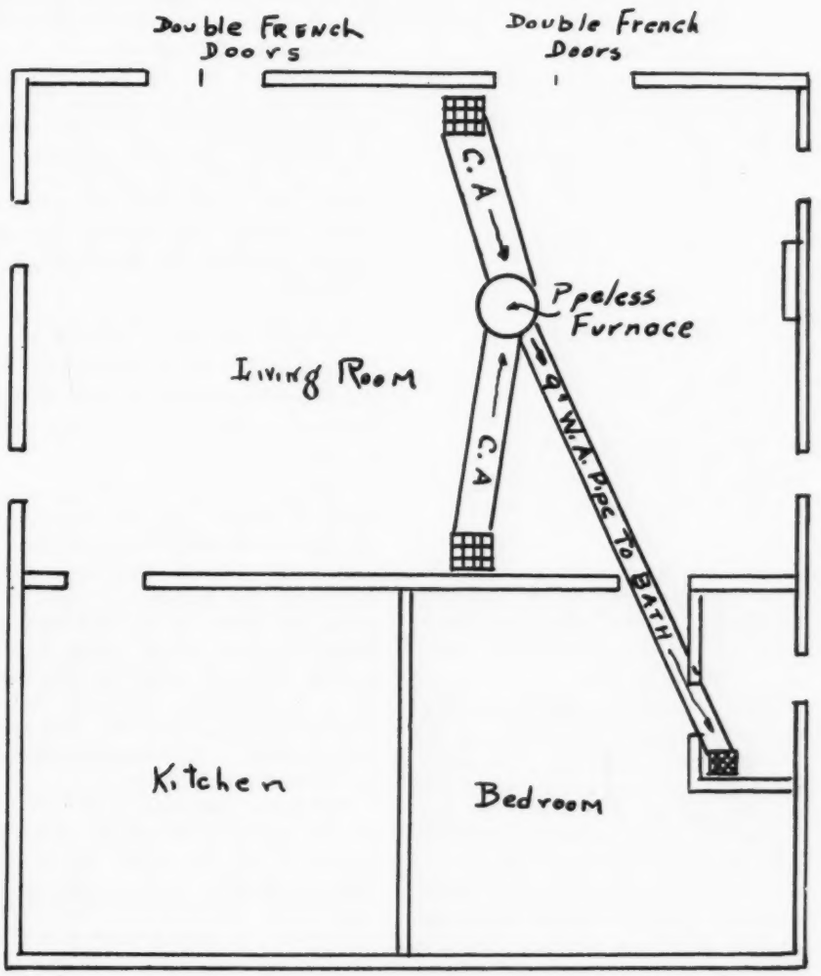
WE conclude in this issue the solutions for the heat robber problem first presented in the November 9 issue. We should like to add that the number of replies received indicates that the use of a robber on a pipeless furnace has seemingly had the thought and attention of a large portion of heating contractors.

Briefly the problem is as follows:

A reader was called in to heat a bathroom closed off and quite a distance from the pipeless furnace used in the house.

This reader's first solution was to run a single leader to this bath—but this leader did not furnish enough heat. The second attempt was made with a heat robber on the leader. The robber used is a flat cone, 18 inches in diameter, hung about 2 inches above the radiator and located to one side of the bonnet. This second solution is not satisfactory, either.

From the replies bringing solutions it is evident that the trouble lies in the robber and not in the idea.



This plan shows how the system is in now. It also shows the bath supply and the robber later. Still the bath is cold

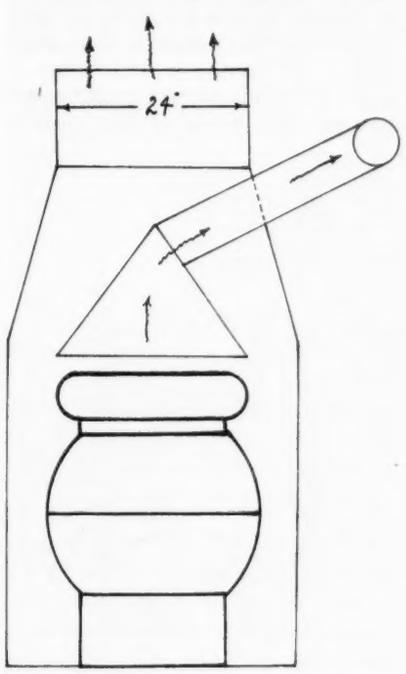
J. W. Birthrong, Waukesha, Wis.

From J. W. Birthrong of Waukesha, Wis., comes a solution very much like those published previously. Just how Mr. Birthrong builds his robber is shown in the sketch. He says:

"In my past experience with pipeless furnaces I have had good luck with a robber such as shown in my sketch. This robber's cone is made the same diameter as the pipe which supplies the main register. If the furnace used has a radiator larger or smaller than the diameter of this main pipe, make the opening of the cone the same size as the diameter across the outside of the opening in the radiator. I usually take the robber pipe off one side and high up toward the peak.

"If the dealer finds this still does not supply enough heat, build a damper in the main register pipe and put some sort of a chain connection to it so that it can be opened or closed from upstairs.

"I usually place the robber cone about 2 inches above the radiator."



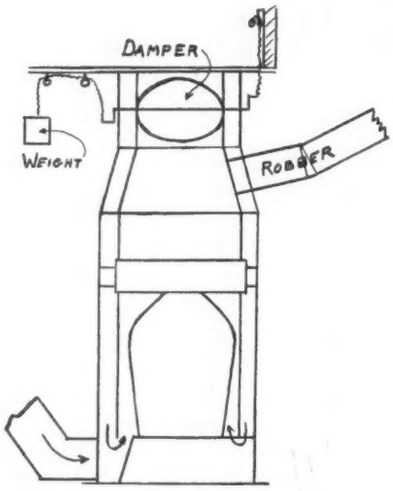
This is the type of robber J. W. Birthrong uses. The cone is off the radiator

W. C. Kuehn, Minneapolis

W. C. Kuehn, who operates the Kuehn Heating Company in Minneapolis, Minn., submits a solution which also lays emphasis on a large damper in the main register pipe. How he builds and connects this damper is shown in the sketch. Mr. Kuehn says:

"There is only one way to get heat through a small robber pipe in a pipeless furnace. That way is—Build a full damper in the main pipe. Extend the damper rod through both sides of the pipe, through the outside cold air chamber also, and put a quadrant on the end of the rod. One end is connected to a chain regulator and the other is weighted to throw the damper open as soon as the chain is released.

"Then extend the warm air casing inside the main casing down to about the level of the grates. The robber pipe is tapped into this main hot chamber close up to the main register pipe.



W. C. Kuehn places a full sized damper in the main pipe and connects this with a house chain. The volume of heat to the bath is regulated by the setting of the damper

If this hinders the warm air flow, add some additional cold air, as shown in the sketch. This should just about equal the amount of warm air taken out by the robber pipe.

"We completed a very interesting application of a robber in a store which illustrates this solution. This store had a low partition which cut off the flow of warm air to a rear room. We installed a 14-inch warm air about 12 feet long inside this room. At the extreme rear end of the room we placed a 14-inch cold air return. We very carefully obstructed the flow of return air in the outside of the duplex register so that the return was just a little more than the area of the warm air. By adjusting the damper we got a positive flow to the rear room and good operation of the rear return.

"A separate compensating return may not be necessary in all residences. We found this out early in our trouble shooting. The reason, we believe, that the robber doesn't always work is because the circulation of the pipeless is so free that the robber has to be long enough and really obstruct the flow through the main register.

"Robbers of the type described can be adjusted to a fine degree. If you want quick heat in the bathroom, close the damper for just a few minutes and throw all the heat generated into the robber pipe. Then when the room is warm enough the damper can be opened to balance the supply through both pipes."

H. E. Clutterham, Dekalb, Ill.

From H. E. Clutterham, of the Standard Foundry and Furnace Company, Dekalb, Ill., comes the following:

"If I were laying out this job originally, I would place the warm air register in the bathroom in the corner nearest the furnace and, if possible, have it in the wall two or three feet off of the floor. I am enclosing an illustration of a robber which I have used in dozens of cases where isolated rooms needed extra heat, and it has met with universal success. This type may be used on either straight pipeless or three-way installations.

"As shown, the robber, or heat deflector, must rest on the radiator and should fit on the inside line of the radiator proper, covering the entire open space. If the heat deflector is not resting on the casting, there would be a tendency, especially on a long run where there is resistance, to draw back return air. Experience has taught that the robber must be placed on the casting. Naturally you will get better results if some cold air is removed from the room.

"I presume that the smoke pipe on this particular job is equipped with a check draft which draws in air from the basement in order to check the furnace, but does not do any good as far as the basement is concerned. The writer has in his own home a run of six-inch pipe connected to an old warm air floor register on one end, and the other end is "T'd" into the side of the smoke pipe just before it enters the chimney. This pipe has a tight damper which is weighted and is connected with the regulator chain ordinarily attached to the check on the smoke pipe. When the furnace is checked, the damper is open and cold air is being drawn off the bathroom floor. This six-inch pipe is thirty feet long, and we can heat the bathroom to over seventy in below-zero weather.

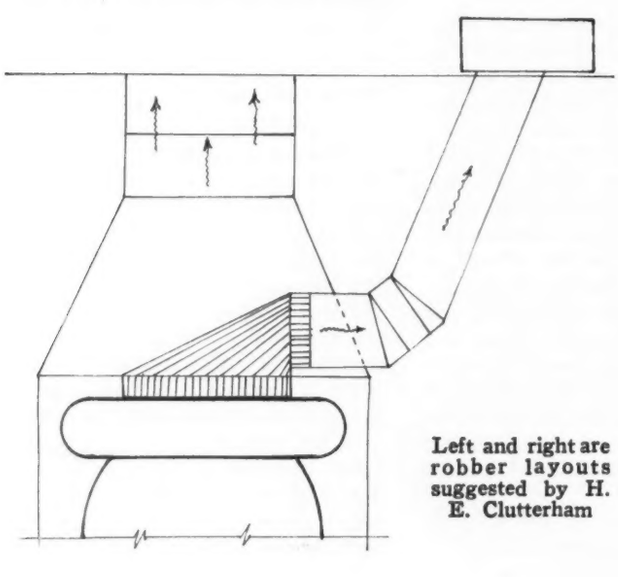
"If this is impractical, place a cold air face in the bedroom just on the other side of the wall from the cold air opening in the living room and connect these two together. If he cares to use the chimney vent, he could connect it to the register which is now used for warm air and place a new warm air register at a point nearer the furnace, or as shown in sketch."

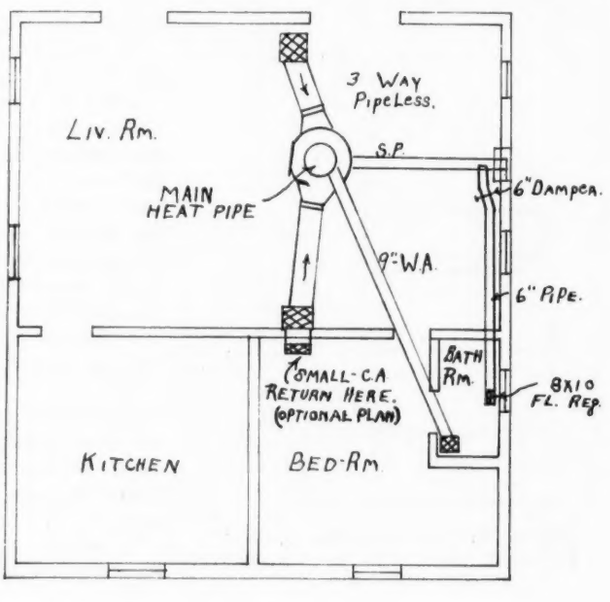
S. F. Bullis, Ottawa, Canada

S. F. Bullis, heating engineer for Beach Foundry, Limited, Ottawa, Canada, writes:

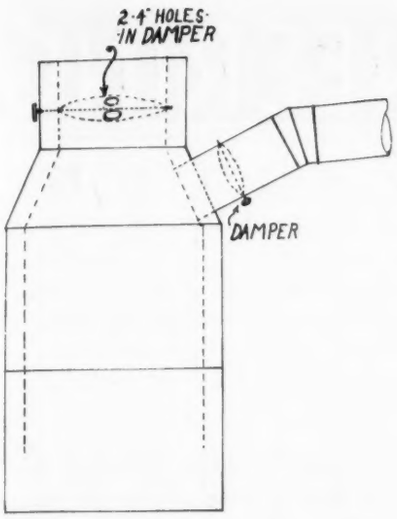
I have installed several systems like the sketch submitted and I find that the only satisfactory solution is to place a large volume damper in the upper section of the pipeless heat pipe. This damper shuts off the flow of heat up through the main pipe and focuses it through the pipe supplying the separate room. No robber is then necessary.

Of course the damper should not fit exactly tight, for if it does there is





Left and right are robber layouts suggested by H. E. Clutterham



S. F. Bullis, from Canada, sends this suggestion which he states he has used with excellent results

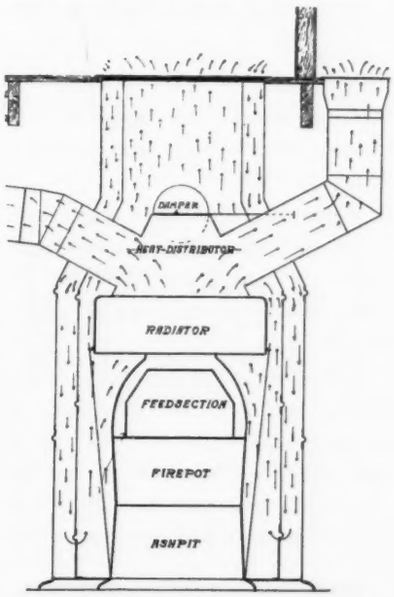
chance of overheating if only the small pipe is open. I provide for this overheating contingency by having two small holes cut through the damper so that no matter if the damper is closed off there will be some circulation of air through the main pipe.

One job in particular that we installed had a separate pipe over 12 feet long. This pipe supplied a good sized kitchen. By using the method shown, this room proved easy to heat to the owner's satisfaction.

Homer Furnace and Foundry Corp., Coldwater, Mich.

From R. W. Strong, of the Homer Furnace and Foundry Corp., comes a letter and a leaflet showing a special robber manufactured by his company. This robber cone can be had in either a one-pipe or a two-pipe takeoff style, each equipped with a damper for the main pipe. Suitable fastenings are provided to hold the cone tight onto the radiator casting.

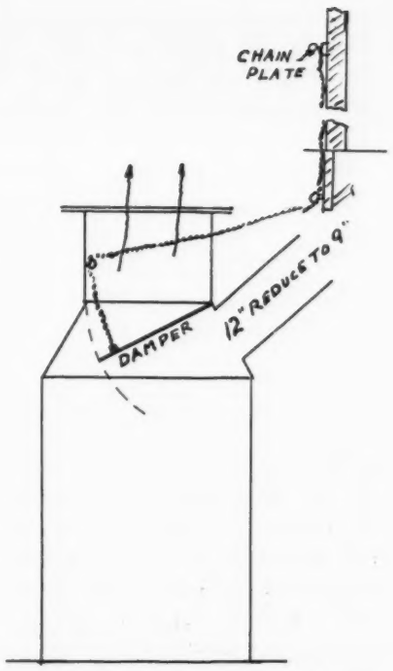
Mr. Strong suggests that one of the important considerations of installing robbers is to be sure that the separate room to be heated shall have free circulation of air and that any air-bound condition be remedied before the robber is installed.



The Homer Furnace and Foundry Co. make a special robber cone like this one. It fits tight to the radiator

F. G. Eldridge, Waterloo, Iowa

From Waterloo, Iowa, Fred G. Eldridge submits a solution and a sketch showing how he uses a special large damper in the main register pipe. He says:



E. G. Eldridge also suggests a full damper in the main pipe. Here is how he places it in the furnace

Place a damper, full size of the main pipe, in the hood. Connect this damper to a chain which is run to the first floor. The damper is hinged as shown in the sketch. The customer can then adjust the damper to throw more or less heat from the main pipe into the robber pipe. If desired, all heat can be diverted into the robber pipe.

I usually take off the robber pipe as a 12-inch size, reducing to about 9 inches. I have found that this system usually works satisfactorily.

Air Conditioning Sells Homes Despite 1931 Conditions

ation. Since the first house was finished there have been over one thousand people who have visited the home and, without exception, all have been interested in the heating and cooling feature of the plant.

Another angle is that Mr. Rousseau has had several requests from prospective homebuilders (who own lots in other sections), to submit bids on homes similarly equipped.

(Continued from page 13)

This phase of the situation was a somewhat unexpected development, but it is naturally very gratifying.

As a result of these installations the South Hills Hardware Company has three "jobs on the boards" in other architect's offices, wherein similar installations have been specified, after an inspection of this job was made. The sales organization has over fifteen additional prospects, who will put in these plants between now and summer. And there has been no special effort as yet made to call or bring these jobs to the attention of other builders or architects—as stated before, the interest generated has all been by and through the efforts of the workmen on the jobs.

FAN BLAST ENGINEERING

by PLATTE OVERTON
ENGINEERING EDITOR

GENERAL DESIGN

THE beginning and end of all fan blast systems, or air conditioning systems, if you prefer to term them such, is in the duct system between rooms and heater.

It is logical, therefore, to begin this series of articles with a discussion of the general design of duct systems.

In a well designed trunk line, the following items must be taken into consideration:

We must provide for the necessary head room.

Leave the plumber space for his pipes.

Stairways must be avoided.

Cold storage rooms and excavated spaces should not be used when possible to avoid and if such areas are used, ducts must be insulated.

Good design must consider heat loss for the duct and allowance must be made on very long runs for a temperature drop.

Duct heat loss should be considered where a duct crosses an unexcavated area, or unheated area, crosses attic spaces, serves attached garages, or rooms over garages, or for branches which are longer than 10 feet.

A common rule among engineers is to figure a heat loss of 90 B.t.u. per square foot of duct. This means all four sides of the duct. This loss must be added to the heat loss of the room.

The safest method is to add this loss to the room loss before you figure the c.f.m. required for the room.

If possible all inlets should be supplied from a single trunk. This methods insures a good balance, reduces the square foot of duct surface, thereby reducing the duct heat loss. Reducing the square feet of duct surface means less material, hence less cost.

Before starting the design of any trunk duct the designer should consider the resistance. We are referring here to the over all resistance.

The best plan is to assume or calculate our over all, or total, resistance and work to it. Let us assume that we have filters, furnace and ducts and our pressure losses are as follows: Over the heater .08, through the filters .07 and we wish to have an over all loss of not to exceed .25 or ¼ inch. This is in inches of water. $25 - (.08 + .07) = .10$ for our duct or trunk lines and as we will assume that our return will be ½ of this loss we have $.10 \div 2 = .05$ for our supply trunk. For detailed discussion of this matter of loss, refer to my article in the September 14, 1931, issue.

We are supplying 2,000 c.f.m. and our trunk with 10 feet for each elbow for equivalent length equals 50 feet in length. We now refer to the resistance chart (see November 23, 1931, issue). As this reads in ducts 100 feet long we have $.05 \times (100 \div 50) = .10$. Finding .10 at the base of the chart we follow up until we intersect with the 2,000 c.f.m. line from the right and find we have a 19-inch duct with a velocity of 1,050 feet per minute.

It will be well to state here that contrary to the general idea, *we must have static resistance* in our supply duct. Designers who advocate large, over sized ducts, with low velocities and then advise the installation of volume dampers are only fooling themselves. The volume dampers they install serve but one purpose; to make static resistance.

Bear this in mind—that if we run a 30-inch duct in place of the 19-inch as we have estimated, we must install volume dampers in the various branches and when the system is balanced we will have the same friction loss, approximately. The size of our stacks ($3½ \times 8 - 10 - 12$) being the same for both

We began in the December 21 issue a discussion of an "Ideal" residential heating system. It was our intention to carry out that system so that on completion every reader would know just what could and what should not be designed into such a layout.

It has been impressed on us, however, that to discuss such an ideal system requires a knowledge of the fundamentals of air conditioning which few contractors possess at this time.

Our plan has, therefore, been changed so that the general layout of this ideal system becomes a basis for a complete discussion of all those fundamentals which must and should be fully understood.

The articles to follow will be based on the dozens of engineering questions submitted to Platte Overton. These questions will be

Your questions, if you will submit them, will be incorporated in these articles. These questions will be answered with as little "technique" and formula as possible. Send in the questions.

trunks, the designer who sizes his trunk duct to velocities rather than to pressure loss is of course basically wrong, but practically he may be safe. We may say that for the average installation of from 7 to 12 rooms a 1,000-foot velocity in the trunk where it leaves the heater is good practice.

We will repeat here the table given in the AMERICAN ARTISAN issue of November 9th. In sizing trunk ducts to velocities we may use the following:

800 c.f.m. total	900 ft. per minute
1,000 c.f.m. total	950 ft. per minute
1,200 c.f.m. total	1,000 ft. per minute
2,000 c.f.m. total	1,150 ft. per minute
3,000 c.f.m. total	1,250 ft. per minute
4,000 c.f.m. total	1,350 ft. per minute
5,000 c.f.m. total	1,450 ft. per minute

The writer receives many letters asking for "short" and "easy" methods for the sizing of trunk ducts. The writers request some constant whereby they can multiply the area of the front door by 2 or some easy factor in the Standard Code by an even number that will require no thought or study. The answer is of course obvious. There is no such factor and there never will be.

Mr. B. F. John, of Philadelphia, submits the following question: "Please explain your method of sizing the two single runs on the included sketch." (Fig. 1.)

We will assume that the two trunk lines indicated are sized to resistance and with air at 135 degrees. We will also assume that the trunk duct to the right supplying 100,000 B.t.u. is 50 feet long including the equivalent length for elbows. We will further assume that the pressure loss in this trunk, the longest one, is 1/10 of an inch.

Here is an instance where the "rule of thumb" won't work. We must use formulas and these have to be worked out.

These two single runs must be sized to 1/10 of an inch resistance.

We may determine these sizes from the equation—

$$V = 4005\sqrt{\frac{P}{F}}$$

Where

V = velocity in duct in ft. per min.

P = desired pressure loss.

F = factor for run established on an average of 10 feet of duct, 2 average elbows = 2.

Hence: $V = 4005\sqrt{\frac{.10}{2}} = 4005 \times$ sq. root of $.05 = 4005 \times .07071 = 283.19355 = 283$ for V.

Volumes of air = B.t.u. ÷ 62 for 135 deg. inlet temp.

100,000 = 1613 c.f.m.
50,000 = 806 c.f.m.
7,000 = 113 c.f.m.
3,000 = 48 c.f.m.

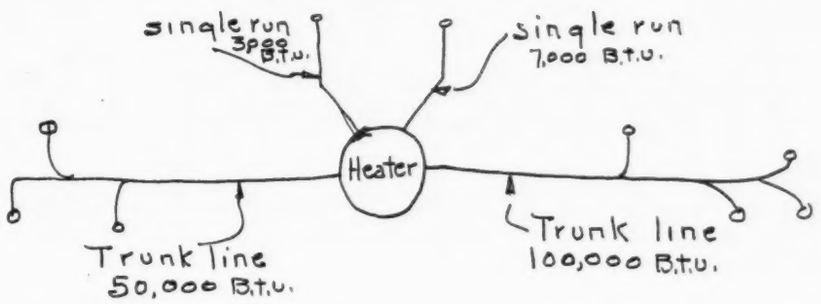
Hence 113 ÷ 283 = .4 sq. ft. duct = 8½ in. approx. (round pipe); 48 ÷ 283 = .17 sq. ft. duct = 5½ in. approx. (round pipe).

Various conditions may change the value of F in the above equation. Here is a case where volume dampers may be used if the design is complicated. Install 9-in. ducts for both runs and set dampers to volume. These intricate formulas may be avoided by taking the two separate runs from one trunk.

Another frequent question is—should duct construction be standing seam or flat locks. Standing seam ducts have the disadvantage of requiring two more inches of room than those with flat seams. Again, the sharp corners of the seams are hazardous to those walking below them. However, they have the advantage of bracing the metal on wide shallow ducts. The type of duct will be largely governed by the available head room and the location of the heating unit.

This is involved with the design of the system, and a large trunk duct may split into two or more branches immediately after leaving the heater or it may be more convenient to install two smaller trunks than a single large one.

FIG 1



Above is a layout submitted by B. F. John of Philadelphia. He says this is a typical installation in his territory. He wants to know how to size the two individual runs to get the required duct size for the required c.f.m.

Below is a more nearly exact layout of the same problem. In order to answer this question we must use complicated formulas. Rule of thumb won't work. If you have a rule which will work this out I will be glad to hear about it. The text explains how I would calculate this problem

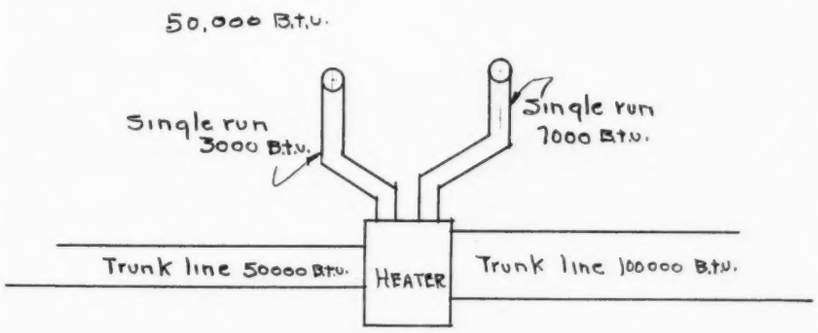


FIG. 2.

Next Week Will Be

THE LOUISVILLE CONVENTION

I'LL see you in Louisville!

Hundreds of letters going through the mails these last few weeks have carried that notation. For Louisville in the week of January 25 to 30 will be the scene of the biggest and most unusual convention the sheet metal and roofing industries have ever held. In that week all roads will lead to the Blue Grass city.

Advance information from the convention committee brings the news that undoubtedly this year's convention will hold more of importance and interest than any convention yet staged. In this year's meeting the sheet metal contractor will meet with the contractor specializing in roofing, in slate, and a whole lot of men whose chief interest lies in warm air heating.

This year's program will be unique in many ways. The committee has so arranged the schedule of meetings that each individual interest will have time for group meetings without interfering with the joint meetings of all three industries.

Speakers of national importance and standing will be on the program to discuss subjects of interest. In addition, a new feature will be the fellowship luncheons at which all industries will be led in round-table discussions of such important subjects as "Relation of General and Sub-Contractors," "Warm Air Heating and Air Conditioning Problems" and others equally important.

There will be, in addition, a display far exceeding anything held in past years. Some of the largest manufacturers in the industries will display their products in booths especially arranged and manned for this convention. The latest products will be shown.

Headquarters for all convention activities will be in the Brown Hotel, Louisville. The chairman of the Committee on Arrangements is J. E. Merrick, past president of the national association.

The committee wishes all members who attend to be sure that they secure from the railroad ticket office when they buy their tickets a reduced return fare certificate. This is important to you because with the large attendance looked for at the joint meeting it is thought certain that every man attending will get his return fare for half cost if he presents a certificate. Don't forget this certificate. If you do, you are spending money you don't have to.

Here is the program arranged for your enjoyment and profit.

MONDAY, JANUARY 25

Opening of Sales Promotion Exhibit

Fellowship Luncheon

Conference Committee and Exhibitors.

3:00 P.M.—Meeting of Directors, National Association of Sheet Metal Contractors.

TUESDAY, JANUARY 26

Architect, Owner and Organization Relationships.

"Better Standards and Teamwork Through Organizations and Better Conditions and Standing for Trades," by Clark I. George, Chairman, Roofing Contractors Division, National Slate Assn.; J. Boyd Griffiths, President. United Roofing Contractors Assn.; George I. Ray, President, National Assn. Sheet Metal Contractors.

"How the Roofing and Sheet Metal Trades Can Improve Their Service to Architects and Owners." Robert D. Kohn, President, American Institute of Architects.

Fellowship Luncheon.

Louisville Building Congress and Louisville Chapter American Institute of Architects co-operating and participating.

Presentation Governor of Kentucky, Mayor of Louisville, and other honored guests. J. E. Merrick, Chairman, Louisville Committee of Arrangements, presiding.

"Profitable Teamwork in the Louisville Building Industry," by Thomas J. Nolan, Architect, President, Louisville Building Congress.

Round Table Discussions

A—Sheet Metal: George I. Ray, President, National Assn. Sheet Metal Contractors, presiding.

B—Asphalt Roofing and Siding: R. W. Thompson, President, Northwest Ready Roofing Co., Omaha, Neb., presiding.

5:00 P.M.—Meeting of Directors—United Roofing Contractors Association.

9:00 P.M.—Fellowship Reception—Supper Dance and Entertainment.

WEDNESDAY, JANUARY 27

General Contractor and Sources of Supply Relationships

J. Boyd Griffiths, President, United Roofing Contractors Assn., presiding.

"Eliminating Abuses, Losses, Unnecessary Costs and Wastes in Practices and Relations of Roofing and Sheet Metal Trades with General Contractors," by Alan Jay Parrish, Vice-President, Associated General Contractors of America.

Discussion led by Oscar A. Reum, Chicago, President, Contracting Plasterers International Assn., and T. T. Flagler, President, The Flagler Co., Atlanta, Ga., Past President A. G. C.

"How Roofing and Sheet Metal Trades Have Saved Money and Improved Service in Their Dealings with Producers and Supply Sources."

A valuable discussion between the Trade and Exhibiting Manufacturers and Distributors.

"The Better Selling Movement," by D. M. Strickland.

Fellowship Luncheon

Louisville Builders Exchange, Louisville Chapter Associated General Contractors, and Kentucky Chapter American Institute of Architects, co-operating and participating.

"Mutually Profitable Relations of General and Sub-Contractors in Louisville," by Henry Wortham, President, Louisville Chapter Associated General Contractors.

Round Table Discussions

C—Built-up and Flat Roofing, Insulation and Waterproofing Problems: J. Boyd Griffiths, President, United Roofing Contractors Assn., presiding.

D—Warm Air Heating and Air Conditioning Problems: George Harms, F. Meyer & Bro. Co., Peoria, Ill., presiding.

5:00 P.M.—Meeting Executive Committee—Roofing Contractors Division of National Slate Association.

6:00 P.M.—Dinner Meeting—National and Local Association Officers and Committeemen.

"How to Improve Effectiveness and Relations of Various Organizations of Trades, and Avoid Duplication of Effort."

THURSDAY, JANUARY 28

Coming Down to Brass Tacks . . . Talking Shop!

Clark I. George, Chairman, Roofing Contractors Division N. S. A., presiding.

"How Are You Going to Make More Money in 1932?" by E. St. Elmo Lewis, Philadelphia.

An Open Forum Discussion.

Fellowship Luncheon

Jointly with Louisville Rotary and Other Service Clubs.

"Minding Your Own Business in 1932," by E. St. Elmo Lewis, Philadelphia.

Round Table Discussions

E—Asbestos, Slate and Tile Roofing Problems: Clark I. George, Chairman, Roofing Contractors Division N. S. A., presiding.

Banquet

FRIDAY, JANUARY 29

Annual meetings of the National Organizations, for election of officers—Reports of committees and other routine matters. Adoption of resolutions.

Final Fellowship Luncheon

"Impressions of the Conference—What Is Ahead for These Industries?" by Edwin A. Scott, President, Sheet Metal Worker.

Message from other editors and publishers of business papers in these industries.

Adoption of Conference Resolutions and Plans to Get Action on matters brought before the Conference.

We mentioned that many firms of national importance will display.

(Continued on page 29)

A CAMPAIGN For the BUILDING INDUSTRY

FROM all indications, 1932 is going to be a critical year for the building industry.

As we write this, we have yet to know just what effect the President's credit organization will have on the great mass of frozen real estate and building project financings. We have yet to determine whether or not 1932 will see a normal volume of large structure construction. We have yet to see just what sort of consideration the American public is going to give to suggestions for home building.

One thing is certain. The building industry is going to have to fight an even more intense campaign to get the public's money into a hundred other products than the home. We know that the manufacturers of electric ranges, for instance, are going to spend above three millions of dollars to popularize the electric stove. We know that the electrical refrigeration and the radio industries will spend as many millions to push their products. We can be certain that the automobile industry will make an intense drive for new car sales this year.

The important feature of this situation is that every dollar the public spends for these products will be just that many dollars lost to the building industry.

If the building industry is to pull itself out of the present morass of doubt, depression, falling sales, and disrepute, some sort of a concerted effort must be made to focus the public's attention on the benefit and value of spending their money on home improvements.

For the past few weeks Chicago editors of business papers serving the building field have been working to perfect a plan under which the public's attention can be focused on the home. After weeks of effort a publicity campaign has been worked out by which any contractor, whether he sells furnaces, sheet metal work, shingles, plumbing, building materials, or what not, can join with all other contractors or agencies in the home building field to back a campaign which has as its slogan—

SPEND FOR THE HOME IN 1932

It is hoped that this campaign can have the backing of every organization in the building field. It is a campaign that every manufacturer of furnaces, metal products, accessories, can profitably push through their trade and national advertising, on their direct mail literature, through their salesmen, and through their dealers.

We feel sure that more people are now thinking of the home than at any time during the last ten years. Folks haven't as much money for high priced shows, entertainment, trips around the country.

If, then, people are more at home, it is logical that they can now be appealed to with the proposition of making that home a better place in which to live.

The illustration on this page is a reproduction of a window poster which can be used for window display. Manufacturers can use these for all their dealers. Small cuts can be secured to be placed on your letterheads. The editors' association will prepare publicity releases to be sent to building page editors, magazines, and other mediums.

No effort will be made to keep this campaign a strictly AMERICAN ARTISAN service. The program was conceived in conjunction with representatives of many industries. The men working on the program want every agency interested to co-operate. The editors want all the suggestions readers have to offer.

GRAVITY EXHAUST VENTILATION

Back Drafts and Their Control

By **PAUL R. JORDAN***

Every once in a while we get a letter from a ventilation contractor asking what he can do to eliminate back drafts in a gravity or a fan system. We have noticed that such inquiries are becoming more frequent as ventilation assumes more importance. This article by Paul R. Jordan discusses some of the principles of backdraft control. If you have specific problems on backdraft control we will be glad to aid you with suggestions if you send us details of the layout

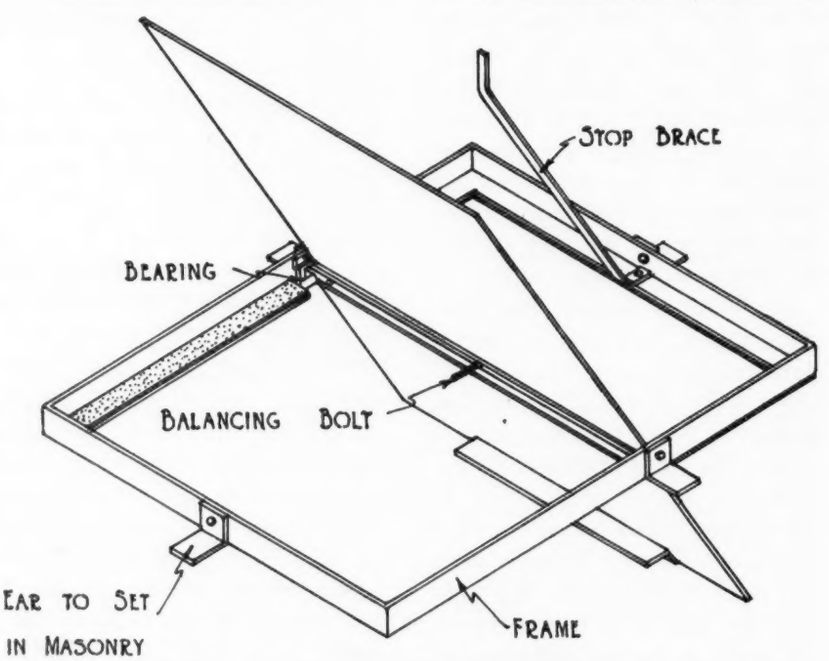
THE subject of backdraft dampers has been coming up more and more frequently, and the possibilities of their use is of sufficient importance to warrant an understanding of them by the heating and ventilating contractor who installs or services pressure fan systems.

There are three kinds of dampers commonly used in conjunction with air distribution, namely, the volume damper, the stop-off damper, and the backdraft damper. The volume damper, used to balance up air delivery in different flues of the same system, is too well understood to need comment. The stop-off damper, which is used to stop entirely the air flow through any given flue, is also a commonly known device. The backdraft damper is a rather newer development, and its value has been accentuated recently, by the growing use in heating and ventilating, of the unit heater type of equipment.

It would be more accurate to call a backdraft damper an anti-backdraft damper, because its principal value lies in its elimination of backdrafts. In other words, it allows air to flow in one direction, but stops it from flowing in the opposite direction.

As indicated above, its use is confined to fan or blower systems. No backdraft damper has yet been devised which will operate satisfactorily on a gravity job. The pressures on a gravity job are too light to assure the operation of a damper of any kind. It seems apparent that a damper made for automatic operation by gravity air flow would have to be balanced so delicately that a nominal accumulation of dust and dirt would throw it out of balance.

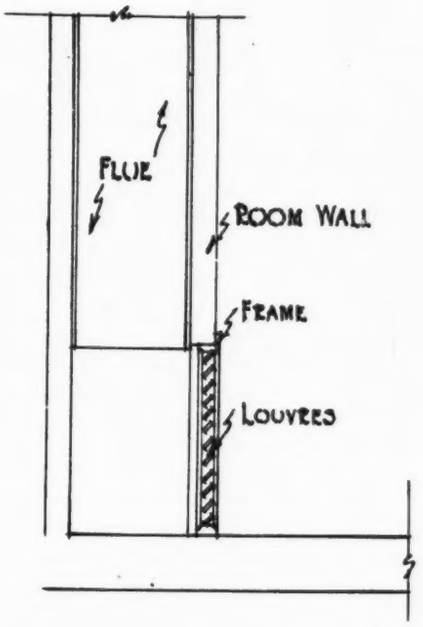
In fan work, the source of heating trouble frequently is traced to backdrafting, or a reversal of air direction. Where there are rooms opening into a common corridor, this sort of thing is rather likely to happen, especially when all or part of the fans are shut down. Where intakes are closed off and exhaust flues left open, backdrafts are a normal result. In case intakes are manually operated, manually operated dampers in the exhaust flues will answer all purposes. But in the case of fans, where intakes are controlled with switches (that is the



This drawing shows a back draft damper of the single leaf type. The success of the damper depends greatly upon the accurate balancing of the leaf. This leaf is balanced by an adjustable bolt.

**The Paul R. Jordan Co., Indianapolis, Ind.*

LOUVRED BACKDRAFT DAMPER



This is a louvre damper set in a wall. The damper consists of several very light leaves which open to a slight pressure, but which close just as quickly as the pressure is reversed. Such a damper may be installed at the base of a flue or in an outside wall.

fan is turned on and off), an automatic closing off of the exhaust flue is desirable.

This proposition of backdrafts is frequently put up to the ventilation contractor for elimination. Some fundamental facts on the control of backdrafts may, therefore, be in order.

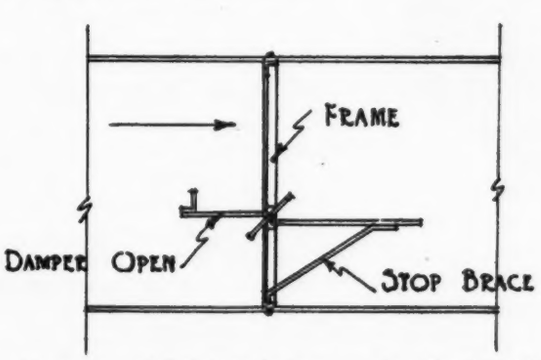
The positive element in this case is the pressure set up by the fan. The fan may be either an intake or exhaust fan, and still will furnish sufficient pressure to open an automatic backdraft damper when the fan is turned on. The damper therefore, should be balanced closed, so that it will swing back into a closed position as soon as the pressure set up by the fan is cut off. If it does not close, cold air may filter down slowly through an exhaust flue in sufficient quantity to upset the heating arrangements, forming floor drafts and even freezing the plumbing, while not coming down with sufficient velocity to offer any positive closing action against the damper.

There are three possible installations for backdraft dampers, namely (1) at the mouth of the flue where it opens into the room, (2) in the vertical portion of the flue leading from the room, or (3) in the horizontal portion of the flue in the attic or roof space, leading to the ventilator.

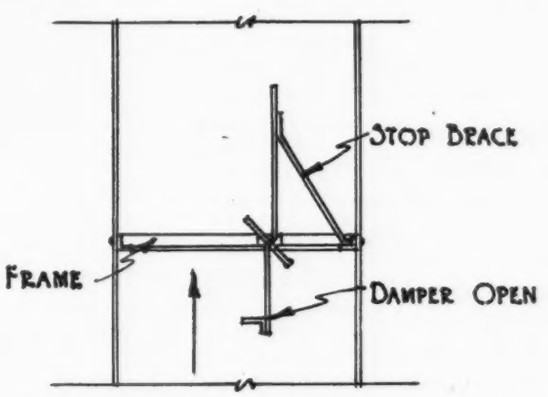
The style of backdraft damper used in the mouth of the flue is the louvred type, usually made up of a number of narrow louvres, constructed of aluminum so light that the air pressure will open them. When the air pressure is released, the louvres will drop back closed of their own weight. This type of backdraft damper should be protected by a screen, as it sets in the side wall of the room in full view.

The style of damper used on both vertical and horizontal installation is the single leaf type, but the balance must be different for vertical and for horizontal operation. The size of the damper makes counterbalancing necessary, and this must be so accurately done and with such knowledge of the principles of balancing, particularly in relation to the center of gravity, as to make it highly impractical for the individual shop to satisfactorily manufacture its own dampers. Also, certain patented features of both the louvre type and the single leaf type dampers, make them impractical of shop manufacture.

The single leaf type is sometimes used for installation in old flues where unit heaters have displaced a gravity system of heating and ventilation. These old flues are usually too large, and it is desirable to cut down their area in order to maintain a slight pressure within the room. This pressure can be regulated either by bending the stop brace to keep the damper from opening to its full capacity, or by adjusting the counter-balance on the valve itself.



Above is a single leaf damper set in a horizontal flue. The leaf should be balanced while the leaf is closed to insure the damper remaining closed when pressure is reversed or absent.



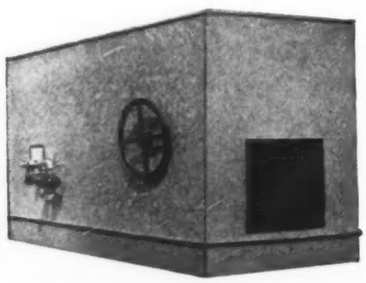
Another single leaf damper, this one in a vertical flue. In both installations a stop brace is used to control the maxmum opening.

New PRODUCTS

Pioneer Weather King Washer Announced

The Pioneer Weather King, a new blower, washer and humidifier, is announced by the Menominee Air Washer Company of Menominee, Michigan.

The new washer is of conventional design with the blower and washer mounted end to end in a single cabinet. The company states that the unit can be used for



cooling and de-humidifying if the water supply is sufficiently cool. In addition to the usual spray heads a section of the cabinet contains scrubber plates for the removal of excess moisture and dirt which might pass through the spray.

The unit, sizes, points of interest, etc., are all explained in a small folder which the company is prepared to mail to any dealer writing for literature.

✦

Rival Strap Corp. Wins Patent Suit

The following announcement comes from David Levow, president of the Rival Strap Corp., New York City—

Alfred C. Coxe, United States District Judge, in the United States District Court, Southern District of New York, decided on December 8, 1931, in the case of Daniel J. Finucane and Rival Strap Corporation, Plaintiffs, vs. Apex Gutter Hanger Corporation and Max Rachlin, Defendants, that the Defendants' Straps are infringing on the Finucane Patent No. 1,676,485, issued July 10, 1928, and agrees with the decision of Judge Slick of the Eastern District in Finucane vs. Swimmer, 45 Fed. (2) 798; that the Patent of Finucane is valid.

Injunctions have been granted, restraining the manufacture, use or sale of the defendants' straps.

The only ornamental leader straps licensed under the Finucane Patent are manufactured by the Rival Strap Corporation, exclusive licensees under this patent. They are sold through jobbers only.

David Levow is also mailing to the trade, with his compliments of the season, a very attractive and useful diary. In addition to space for the diary the book has valuable tables and lists of information. A copy of this diary will be mailed upon request. The address is 308 West 20th St.

✦

American Furnace and Foundry Co. Announce New Product

The American Furnace and Foundry Company, Milan, Michigan, announces a new combination steel and cast furnace claimed to have several unusual and noteworthy features. Details of the new product are shown in a four page folder

which will be mailed to dealers upon application to the manufacturer.

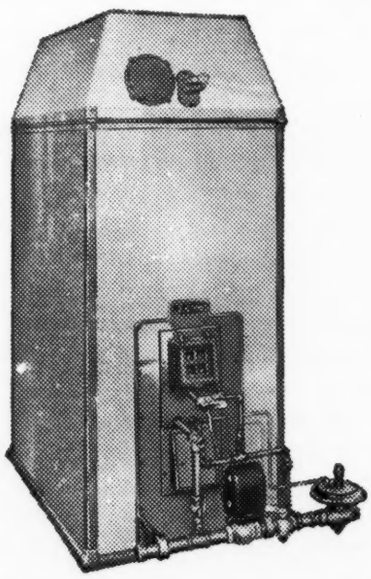
The feature of most interest is the combining of all steel drum and an all-cast, one-piece radiator. The joint between the radiator and the drum is said to be similar to the joint used in an automobile engine head—bolted through a gasket.

A number of other features are claimed for this furnace, all described in the folder. The folder also contains full dimensions and details of the complete line.

✦

Round Oak Making New Gas Furnace

The Round Oak Furnace Company, Dowagiac, Michigan, announces new and advanced model gas fired furnace and a new gas floor furnace. These units com-



plete the company's line of coal fired and gas fired furnaces. In addition to these new furnaces the firm is also selling the necessary units to supply dealers with the equipment necessary for semi-air conditioning.

✦

Permite Resalum, a New Paint, Announced

Aluminum Industries, Inc., Cincinnati, Ohio, announces a new aluminum coating known as Permite Resalum. This is said to be an entirely different product—it is not a paint—but a coating.

Among the properties claimed for the material is a greater covering power than paint, resistance to heat, resistance to corrosion, resistance to weathering and more than usual light reflection.

The product can be used on wood, fabric, stone and is especially good for metal.

Personals . . .

International Nickel Co., Promotions Announced

Two promotions in the technical staff of The International Nickel Co., Inc., were announced today by A. J. Wadhams, manager of the Development and Research Department of the company.

T. H. Wickenden, since 1922 in charge of the company's development work in the automotive and aeronautical fields, has been appointed assistant manager of development and research.

H. J. French, since 1929 a member of the International Nickel Company's research staff at its laboratory in Bayonne, N. J., has been transferred to the Development and Research Department in New York to take charge of development work in steel and iron.

✦

Armco Moves Cincinnati Office to Middletown

The Cincinnati district office of The American Rolling Mill Company will be removed to the home offices of the company in Middletown, Ohio, on or about January 16th.

Resident salesmen will remain in Cincinnati, and direct telephone communication between Cincinnati and Middletown will be maintained in order to continue the close personal contacts with Armco customers in the metropolitan Cincinnati area.

✦

"Bob" Schmieder Joins Super Steel Products Co.

Announcement is made to the sheet metal industry that beginning January 1 R. S. (Bob) Schmieder becomes actively associated with the Super Steel Products Company, 325 W. McKinley Ave., Milwaukee, Wis.

"Bob" needs no introduction to the industry for in his 18 years service with the Milcor Steel company he gained the confidence and respect of manufacturers, jobbers and contractors, as well as a wide acquaintanceship among architects, engineers and others affiliated with the sheet fabricating industry.

The Super Steel Products Company are manufacturers of fireproof windows and doors, skylights and extruded metal work. They have been especially active in the use of new metals and new uses of old metals.

John W. Lees, Inland Steel Co. Official, Dies

John W. Lees, 68, vice-president of the Inland Steel Company, died Sunday, January 3, in his home in Indiana Harbor, Indiana. He had been ill for ten years and had been retired from active business during the major part of that period.

Mr. Lees came to Inland in February, 1903, as general superintendent of the Indiana Harbor Works and made an exceptional record of splendid achievements over a period of 18 years. He was made a vice-president in 1921 but due to poor health was never very active after that year.

Mr. Lees is survived by his widow and one daughter.

✦

B. T. Wilcott to Represent Deshler

The Deshler Foundry Company, Deshler, Ohio, announces that B. T. Wilcott has been appointed representative in the Kansas City territory. Mr. Wilcott will have headquarters at 624 Prospect St., Kansas City, Mo. A representative stock of Deshler products will be carried in the warehouse of the Kansas City Furnace Company to facilitate shipments to dealers in the Kansas City area.

✦

Meyer Furnace Co. Celebrates 50th Anniversary

The Meyer Furnace Company, Peoria, Ill., is this year celebrating the fiftieth anniversary of the company's founding. The company was organized in 1882 when the first patent on the Weir furnace was granted.

The Meyer company calls attention to the fact that for a product to survive for fifty years is a mark of distinction. The company is more proud, however, of the fact that the Weir furnace, the pioneer steel furnace, is giving the type of service claimed for it when patent was granted. Betterments have been made from time to time to keep the furnace up-to-date, the company states.

✦

Lastik Products Co. New Leaflet

The Lastik Products Co., Oliver Building, Pittsburgh, Penna., is mailing out a new piece of literature descriptive of their Wampum Brand furnace cement. The information is cleverly prepared in a eight-page folder of special design.

Copies of the mailing piece can be secured if you did not receive one.

New Literature

Republic Steel Issues Two New Publications

Republic Steel Corporation, Massillon, Ohio, have two new booklets of interest to contractors and jobbers.

One booklet, "Use of Stainless Metals in Dairy Industries," is elaborately illustrated with installations in this industry. The text explains the composition of stainless metals, how these metals meet the peculiar problems of dairying, what these problems are, and recommended methods for working the metal.

The second booklet, "Rail Steel Products," devotes space to descriptions of rail steel products which are not directly in our field, but also contains several pages of descriptive matter pertaining to fence posts and tubing.

LOUISVILLE CONVENTION

(Continued from page 24)

As this issue of AMERICAN ARTISAN goes to press the list of firms using display space is as follows:

The American Brass Co.
American Filter Co.
The American Rolling Mill Co.
Armstrong Cork & Insulation Co.
The Barber Asphalt Co.
The Barret Co.
Bird & Son, Inc.
Certain-teed Products Corp.
Copper & Brass Research Assn.
Cork Import Corp.
H. Eikenhout & Sons
Enterprise Boiler & Tank Works, Inc.
The Flintkote Co.
Benjamin Foster Co.
Hetzel Roofing Products Co.
B. Mifflin Hood Co.
C. G. Hussey & Co.
Interlocking Flashing Corp.
The International Nickel Co., Inc.
Johns-Manville Corp.
Paul R. Jordan Co.
Josam Manufacturing Co.
Keasey & Mattison Co.
Langenberg Manufacturing Co.
David Levow.
Littleford Brothers.
Ludowici-Celadon Co.
F. Meyer & Brother Co.
Murray Tile Company, Inc.
National Slate Assn.
Newport Rolling Mill Co.
Parker Kalon Corp.
Payne Furnace & Supply Co., Inc.
Republic Steel Corp.
Revere Copper and Brass, Inc.
The Ruby Chemical Co.
Whitney Metal Tool Co.
The Williamson Heater Co.

SQUARE CASINGS

On a furnace, or casings that are on the square.

After you have sold a square casing job, and got yourself in trouble when it won't work without a fan, let us show you why a Peerless Square Casing (Patented) Furnace can be connected to the same piping, and satisfy your customer with its performance.

Let us show you why the ordinary square casing cannot compare with Peerless.

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Pioneers in Warm Air Heating Since 1895

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WEATHER MAKING

Holds the Headlines of Public Interest

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Menominee Michigan

Air Conditioning Machinery

DEALER PRICE

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Including every necessary fitting. Sells for $45.00 plus installation

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The Outstanding NET-Profit Producer in the Heat Control Field

FIRST: Because it is priced to sell to that vast market constituted by folks of moderate means.

SECOND: Because you can't beat its performance at any price.

THIRD: Because it is 100% *dependable*—never requires servicing. Your entire profit, exclusive of selling cost, is *net* profit.

See your jobber at once. Write us for information, sales helps, etc.

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AKRON AIR BLAST

Go after business with the Akron Air Blast—make it your leader.

The public is air-conditioning minded. You can now supply your prospects with a complete air conditioning plant as a single unit. The Akron Air Blast gives 100% Air Conditioning and requires no extras. It is easily installed. Two types—all sizes—Gravity or Single Unit Air Conditioning. Here's "solid comfort" at its best.

Investigate the May-Fiebeger Line, especially the Akron Air Blast.

The MAY-FIEBEGER Co.
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LESS FUEL - MORE HEAT

You're not Skating on thin Ice when You Carry

The WISE-LINE

The Wise Line of furnaces is a balanced line—makes for greater dealer profits. By selling a ***Balanced*** line a dealer is in a position to supply just the right unit at the right price, and at a good profit to himself. Be Wise—learn what the WISE ***Balanced*** Line will do for you.

WISE 20

One of the Wise ***Balanced*** line. The "20 Series" Cast Furnaces with all the every day features and many unusual ones. The "WISE 20" will bring credit to you as a dealer.

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The Wise "40 Series" is the open dome type with the cellular one-piece firepot, which insures evenly distributed air blast and provides complete combustion.

Self-cleaning radiator with no soot or ash collecting surfaces.

WISE GAS

In presenting the Wise Super Efficient Gas Fired Furnace, we realize that the WISE reputation must be upheld. Therefore, months of engineering, experimenting, testing and proving, stand back of this—The WISE GAS FIRED FURNACE.

Write for Booklets 23 and G2

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Patented July 10th, 1928; Jan. 6th, 1931
MADE IN SIX STYLES
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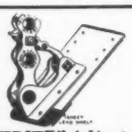
"Fitrite" Bronze Beehive Strainer
For Round Leader
3"-4"-5"-6"-7"-8" Dia.

Type "X"

"FITRITE" Bronze ROOF STRAINERS
3 types for roofs having inside cast iron leaders. Type "X" also made in malleable iron

"Fitrite" Mop Head & Staples
Malleable Iron



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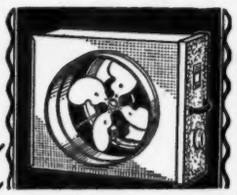

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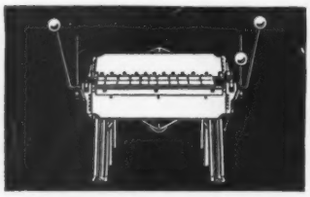

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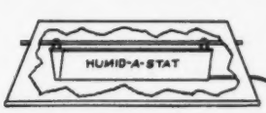

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"They Do the Trick"

The unique design is the Secret Cold Valve operation inside a Water-Sealed Air Chamber. Let us tell you more.

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BECAUSE these owners could and did contact ten new prospects to one old customer at no expense to these owners.

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[*Sixty percent more suction—a speedy, one-man outfit—the motor alone goes upstairs—the large container empties soot like a coal scuttle—safety trap.*]

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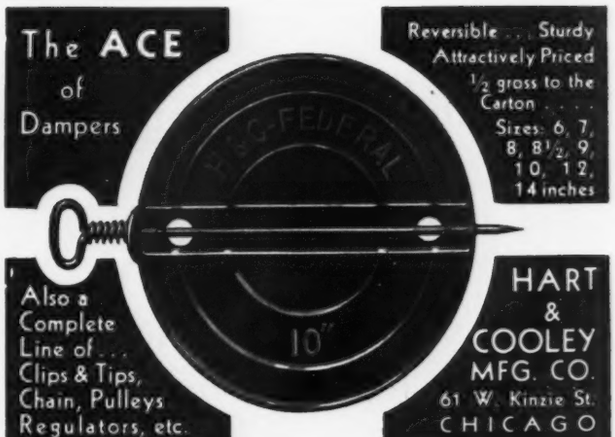
Truly Automatic—

The ACE of Dampers

Reversible . . . Sturdy
Attractively Priced
½ gross to the Carton . . .
Sizes: 6, 7, 8, 8½, 9, 10, 12, 14 inches



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A Pot and Grate for Every Make.

Prompt and Complete Shipments
DES MOINES STOVE REPAIR CO.
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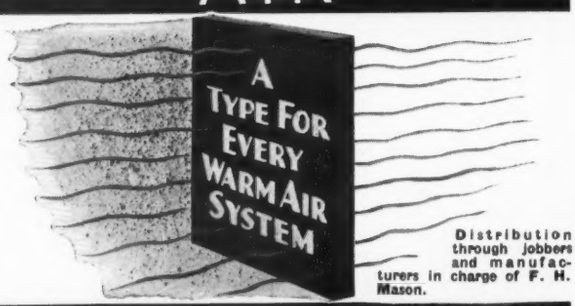

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AMERICAN AIR FILTER COMPANY, Inc.
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Install **ÆOLUS** *Improved* **VENTILATORS**

FOR industrial buildings, schools, homes, theaters, etc. Made in 14 different metals. Constant ventilation—no noise—no upkeep.

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WAMPUM BRAND FURNACE CEMENT

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The **Electric Janitor**

FULLY ELECTRIC MOTOR-DRIVEN

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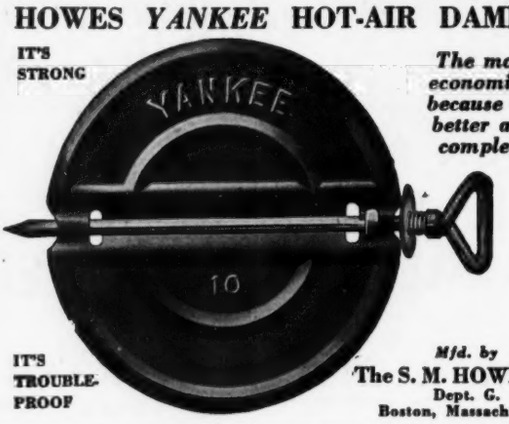
IT'S STRONG

The most economical because it's better and complete



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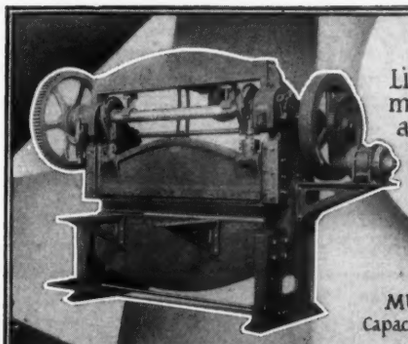

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Saginaw, Mich.

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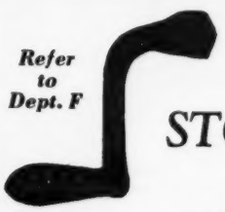

CRANKS *for* STOVES *and* FURNACES

We have over 100 patterns of various sizes and shapes so that we are in a position to fit any range or furnace.

THE FANNER MFG. COMPANY
Brookside Park Cleveland, Ohio

WHITNEY
— LEVER —
PUNCHES

The Choice of Over 50,000 Satisfied Users

Free Catalog Upon Request

W. A. Whitney Mfg. Co.
636 Race St., Rockford, Illinois

The "Torrid" Furnace is designed to give a tremendous amount of heat, much more than that furnished by the ordinary tinner's furnace.

A fuel saver and generating machine of the finest quality made at the price.

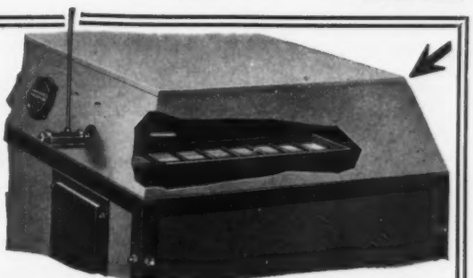
GEO. W. DIENER MFG. CO.
404 North Monticello Ave. Chicago

WATERBURY
SEAMLESS FURNACE
REG. U.S. PAT. OFF. PIPE OR PIPELESS
Guaranteed

Permanently Gas-Tight

The Waterman-Waterbury Co.
1128 Jackson Street N. E.
Minneapolis Minnesota

Entirely Different



AUTOMATIC DRIP HUMIDIFIER

Simple, foolproof, durable and reliable. Entirely different from all others. A Humidifier which offers splendid sales possibilities. *Investigate.*

AUTOMATIC HUMIDIFIER COMPANY
Cedar Falls, Iowa

BUYERS' DIRECTORY

Air Cleaners

American Air Filter Co., Inc., Louisville, Ky.
American Fdy. & Furnace Co., Bloomington. Ill.
General Air Conditioning Co., Inc., Chicago, Ill.
Kleenaire Filter Co., Stevens Point, Wis.
Lakeside Co., Hermansville, Mich.
Meyer & Bro., F., Peoria, Ill.

Air Washers

Brundage Co., Kalamazoo, Mich.
A. Gehri & Co., Tacoma, Wash.
Health Air Systems, Ann Arbor, Mich.
Hess Warming & Vent. Co., Chicago, Ill.
Lakeside Co., Hermansville, Mich.
Menominee Air Washer Co., Menominee, Mich.
Premier Warm Air Furnace Co., Dowagiac, Mich.

Asbestos—Liquid

Technical Products Co., Pittsburgh, Pa.

Asbestos Covering and Paper

Stnadard Asbestos Co. of Chicago, Chicago, Ill.
Wilson, Grant, Inc., Chicago, Ill.

Ash Sifter

Diener Mfg. Co., G. W., Chicago, Ill.

Blast Gates

Berger Bros. Co., Philadelphia, Pa.

Blowers

American Fdry. & Furnace Co., Bloomington, Ill.
Brundage Co., Kalamazoo, Mich.
A. Gehri & Co., Tacoma, Wash.
General Air Conditioning Co., Inc., Chicago, Ill.
Health-Air Systems, Ann Arbor, Mich.
Hess Warming & Vent. Co., Chicago, Ill.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Lakeside Co., Hermansville, Mich.
Menominee Air Washer Co., Menominee, Mich.
Premier Warm Air Furnace Co., Dowagiac, Mich.

Brakes—Bending

Dreis & Krump Mfg. Co., Chicago, Ill.
Interstate Machinery Co., Chicago, Ill.

Brakes—Cornice

Dreis & Krump Mfg. Co., Chicago, Ill.

Brass and Copper

American Brass Co., Waterbury, Conn.
Revere Copper and Brass Inc., Rome, N. Y.

Cans—Garbage

Diener Mfg. Co., G. W., Chicago, Ill.
J. M. & L. A. Osborn Co., Cleveland, Ohio

Castings—Malleable

Fanner Mfg. Co., Cleveland, Ohio

Ceilings—Metal

Globe Iron Roofing and Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Cement—Furnace

Connors Paint Mfg. Co., Wm., Troy, N. Y.
Lastik Products Corp., Pittsburgh, Pa.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Technical Products Co., Pittsburgh, Pa.

Cement—Roofing

Connors Paint Mfg. Co., Wm., Troy, N. Y.
Lastik Products Corp., Pittsburgh, Pa.

Chain—Furnace

Hart & Cooley Mfg. Co., Chicago, Ill.

Chaplets

Fanner Mfg. Co., Cleveland, Ohio

Cleaners—Furnace Vacuum

Breuer Elec. Mfg. Co., Chicago, Ill.
Brillion Furnace Co., Brillion, Wis.
Densmore & Quinlan Co., Kenosha, Wis.
Grand Rapids Furnace Cleaner Co., Grand Rapids, Mich.
National Super Service Co., Toledo, Ohio
J. M. & L. A. Osborn Co., Cleveland, Ohio

Conductor Elbows and Shoes

Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Globe Iron Roofing & Corrugatnig Co., Cincinnati. Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Conductor Fittings

Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
David Levow, New York, N. Y.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Rival Strap Corp., New York, N. Y.

Conductor Pipe

Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Copper

American Brass Co., Waterbury, Conn.
Revere Copper & Brass Inc., Rome, N. Y.

Cornices

Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Crimping Machines

Bertsch & Co., Cambridge City, Ind.
Yoder Co., The Cleveland, Ohio

Cut-offs—Rain Water

Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Dampers—Quadrants—Accessories

Aeolus Dickinson, Chicago, Ill.
Hart & Cooley Mfg. Co., Chicago, Ill.
Howes Co., S. M., Boston, Mass.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Parker-Kalon Corp., New York, N. Y.
Young Ventilating Co., Cleveland, Ohio

Dampproofings

Lastik Products Corp., Pittsburgh, Pa.

Diffusers—Air Duct

Aeolus Dickinson, Chicago, Ill.

Drive Screws—Hardened Metallic

Parker-Kalon Corp., New York

Eaves Trough

Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Eaves Trough Hangers

Berger Bros. Co., Philadelphia, Pa.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Fans—Furnace

A-C Mfg. Co., Pontiac, Ill.
American Fdy. & Furnace Co., Bloomington, Ill.
A. Gehri & Co., Tacoma, Wash.

Filters—Furnace

American Air Filter Co., Inc., Louisville, Ky.
A. Gehri & Co., Tacoma, Wash.
Independent Air Filter Co., Chicago, Ill.
Kleenaire Filter Co., Stevens Point, Wis.
Lakeside Co., Hermansville, Mich.

Fluxes—Soldering

Kester Solder Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Forming Rolls

Bertsch & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill.

Furnaces for Gas or Oil

Dail Steel Products Co., Lansing, Mich.
Health-Air Systems, Ann Arbor, Mich.

Furnaces—Gas

American Fdy. & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Fox Furnace Co., Elyria, Ohio
Henry Furnace & Foundry Co., Cleveland, Ohio
Lennox Furnace Co., Marshalltown, Iowa
Meyer Furnace Co., Peoria, Ill.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Payne Furnace and Supply Co., Beverly Hills, Calif.
Richardson & Boynton Co., New York
Round Oak Furnace Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
Western Steel Products Co., Duluth, Minn.
Wise Furnace Co., Akron, Ohio

Furnaces—Gas Auxiliary

Forest City Foundries Co., Cleveland, Ohio

Furnaces—Oil Burning

Motor Wheel Corp., Heater Div., Lansing, Mich.

Furnaces—Warm Air (See Also Unit Air Conditioners)

Agricola Furnace Co., Gadsden, Ala.
American Fdy. & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Andes Range & Furnace Corp., Geneva, N. Y.
Armstrong Furnace Co., Columbus, O.
Brillion Furnace Co., Brillion, Wis.
Dail Steel Products Co., Lansing, Mich.
Deshler Foundry & Machine Works, Deshler, Ohio
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Enterprise Boiler & Tank Works, Chicago, Ill.
Forest City Foundries Co., Cleveland, Ohio
Fox Furnace Co., Elyria, Ohio
Graff Furnace Co., Scranton, Pa.
Hall-Neal Furnace Co., Indianapolis, Ind.
Health-Air Systems, Ann Arbor, Mich.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Hess Warming & Vent. Co., Chicago, Ill.
Langenberg Mfg. Co., St. Louis, Mo.
Lennox Furnace Co., Marshalltown, Iowa
Liberty Foundry Co., St. Louis, Mo.
May Fiebeger Furnace Co., Newark, Ohio
Meyer Furnace Co., The, Peoria, Ill.
Midland Furnace Co., Columbus, Ohio
Motor Wheel Corp., Heater, Div., Lansing, Mich.
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Payne Furnace & Supply Co., Beverly Hills, Calif.
Peerless Foundry Co., Indianapolis, Ind.
Premier Warm Air Heater Co., Dowagiac, Mich.
Richardson & Boynton Co., New York City
Round Oak Furnace Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
Schwab Furnace & Mfg. Co., Cedar Grove, Wis.
Thatcher Furnace Co., Newark, N. J.
United States Pressed Steel Co., Kalamazoo, Mich.
Waterman-Waterbury Co., Minneapolis, Minn.

Furnaces—Warm Air (See Also Unit Air Conditioners)

Western Steel Products Co., Duluth, Minn.
Williamson Heater Co., Cincinnati, Ohio
Wise Furnace Co., Akron, Ohio

Gages—Draft

Ellison Draft Gage Co., Chicago, Ill.

Grilles

Auer Register Co., Cleveland, Ohio
Chicago Perforating Co., Chicago, Ill.
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Mfg. Co., Chicago, Ill.
Independent Register & Mfg. Co., Cleveland, Ohio
Rock Island Register Co., Rock Island, Ill.
Tuttle & Bailey Mfg. Co., New York
U. S. Register Co., Battle Creek, Mich.

Guards—Machine and Belt

Chicago Perforating Co., Chicago, Ill.
Harrington & King Perforating Co., Chicago, Ill.

Handles—Boiler

Berger Bros. Co., Philadelphia, Pa.

Handles—Furnace Door

Fanner Mfg. Co., Cleveland, Ohio

Handles—Soldering Iron

Parker-Kalon Corp., New York, N. Y.

Heaters—Cabinet

Agricola Furnace Co., Gadsden, Ala.
Motor Wheel Corp., Heater Division, Lansing, Mich.
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Payne Furnace & Supply Co., Beverly Hills, Calif.
Waterman-Waterbury Co., Minneapolis, Minn.

Heaters—School Room

Meyer Furnace Co., The Peoria, Ill.
Waterman-Waterbury Co., Minneapolis, Minn.
Western Steel Products Co., Duluth, Minn.

Humidifiers

Automatic Humidifier Co., Cedar Falls, Iowa
Clarm Mechanical Devices Co., Lima, Ohio
Columbus Humidifier Co., Columbus, Ohio
Diener Mfg. Co., G. W., Chicago, Ill.
Hess Warming & Vent. Co., Chicago, Ill.
Menominee Air Washer Co., Menominee, Mich.
Meyer & Bro. Co., F., Peoria, Ill.
Sallada Mfg. Co., Minneapolis, Minn.
J. L. Skuttle Mfg. Co., Dowagiac, Mich.

Humidifier Valves

Apex Regulator Co., Marshalltown, Ia.

Machinery—Culvert

Bertsch & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill

Machinery—Rebuilt

Interstate Machinery Co., Chicago, Ill.

Machines and Tools—Tinsmith's

Bertsch & Co., Cambridge City, Ind.
Dreis & Krump Mfg. Co., Chicago, Ill.
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Niagara Mach. & Tool Wks., Buffalo, N. Y.
J. M. & L. A. Osborn Co., Cleveland, Ohio
Parker-Kalon Corp., New York, N. Y.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A. Rockford, Ill.
Yoder Co., The, Cleveland, Ohio

Metal Lath—Expanded

Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

(Continued on page 38)

MAKING GOOD ON EVERY COUNT

The re-organized and re-financed company is making good on all its pledges. Over 80% of the **GILT EDGE** dealers have sold **GILT EDGE** Furnaces for 10 years or more. We back every dealer to the limit with cooperation for our mutual success. **GILT EDGE** is a good furnace and a good profit builder.

GILT EDGE
The Furnace with a GOOD Name

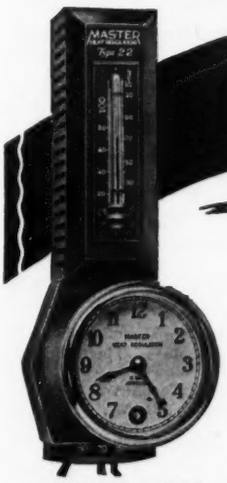
GILT EDGE Furnaces are constructed to give maximum efficiency and a life time of continuous and trouble-free service. They create consumer satisfaction and spread to your prospects like wild fire. Don't overlook this gold mine.

Write for our proposition.

SCHWAB FURNACE & MFG. CO. — **CEDAR GROVE, WISCONSIN**

MILWAUKEE OFFICE — 522 CHERRY STREET

Write for our catalog and dealers' Profit-sharing proposition



8-Day Jewelled Clock Control and Plain Models

MASTER HEAT REGULATOR

Type 22

FULL ELECTRIC

Now more and more people want dependable Heat Regulators

No furnace dealer should neglect the nice profit opportunity that goes with the sale of a line of dependable heat regulators like the MASTER.

This automatic regulator operates instantly when the heat changes one degree or less, as set. A quality, precision instrument—strong simple construction—no delicate parts to get out of order. Type 22, Full Electric, plain and 8-day jewelled clock control. Type 44, Gradual Operation of dampers or valves. Full Electric, Plain and Clock models.

Write us today for complete information and our proposition to representatives.

WHITE MFG. COMPANY

2362 University Ave. — **St. Paul, Minn.**

Get Into the Front Line with LANSING DailAire System *of Air Conditioning*

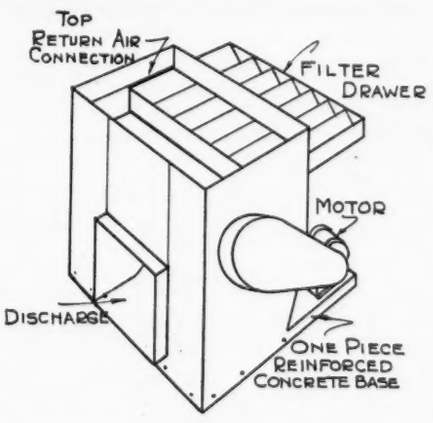
It offers the last word in air conditioning, which is washed air—humidified air—heated air—Forced air and summer circulation and cooling all in one unit.

Air conditioning is the most talked of thing in the heating world today—Now is the time to get the agency of this live specialty line.

The Dailaire line is modern, different and offers many new selling opportunities for the dealer.

Write for agency plan now.

DAIL STEEL PRODUCTS COMPANY
1050 MAIN STREET — **LANSING, MICH.**



LONG LIFE AIR CLEANER and CONDITIONER

A new and silent blower and filter unit. Comes assembled ready to install. Only unit completely assembled at factory on its own foundation. Total weight only 75 pounds. Capacities up to 1800 c.f.m. at ¼" S.P. Adaptable to warm air, steam, vapor, or hot water air conditioning system. Comes attractively painted. Filter dry type in sliding drawer. S. K. F. ball bearings on fan and motor. Requires attention but once per year. Tested and approved at our factory by Platte Overton. Write today for information regarding agency, prices, terms, and window display. A business getter at a price less than blowers and filters in separate units.

THE GENERAL AIR CONDITIONING COMPANY, INC.
2755 West 31st Street — **Chicago, Illinois**

BUYERS' DIRECTORY

(Continued from page 36)

Miters

Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co. Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Nails—Hardened Masonry

Parker-Kalon Corp., New York, N. Y.

Paint—Roof

Connors Paint Mfg. Co., Wm., Troy, N. Y.
Lastik Products Co., Inc., Pittsburgh, Pa.

Perforated Metals

Chicago Perforating Co., Chicago
Harrington & King Perforating Co., Chicago, Ill.

Pipe and Fittings—Furnace

Henry Furnace & Fdy. Co., Cleveland, Ohio
Meyer & Bro., F., Peoria, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
J. M. & L. A. Osborn Co., Cleveland, Ohio
Peerless Foundry Co., Indianapolis, Ind.

Pokers—Furnace

Fanner Mfg. Co., Cleveland, Ohio
Independent Reg. & Mfg. Co., Cleveland, Ohio

Pulleys—Furnace

Hart & Cooley Mfg. Co., Chicago, Ill.

Punches

Bertsch & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill.
Niagara Mach. & Tool Wks., Buffalo, N. Y.
Parker-Kalon Corp., New York, N. Y.
W. A. Whitney Mfg. Co., Rockford, Ill.

Punches—Combination Bench and Hand

Niagara Mach. & Tool Wks., Buffalo, N. Y.
Parker-Kalon Corp., New York, N. Y.

Punches—Hand

Niagara Mach. & Tool Wks., Buffalo, N. Y.
Parker-Kalon Corp., New York, N. Y.
W. A. Whitney Mfg. Co., Rockford, Ill.

Putty-Stove

Connors Paint Mfg. Co., Wm., Troy, N. Y.

Radiator Cabinets

Hart & Cooley Mfg. Co., Chicago, Ill.
Tuttle & Bailey Mfg. Co., New York

Registers

Auer Register Co., Cleveland, Ohio
Forest City Foundries Co., Cleveland, Ohio
Hart & Cooley Mfg. Co., Chicago, Ill.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Independent Register & Mfg. Co., Cleveland, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Rock Island Register Co., Rock Island, Ill.
Tuttle & Bailey Mfg. Co., New York
United States Register Co., Battle Creek, Mich.
Waterloo Register Co., Waterloo, Ia.;

Registers—Wood

Auer Register Co., Cleveland, O.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Regulators—Automatic Heat

Hart & Cooley Mfg. Co., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modern Heat Regulator Co., Cleveland, Ohio
Tuttle & Bailey Mfg. Co., New York
White Mfg. Co., Minneapolis, Minn.

Repairs—Stove and Furnace

Brauer Supply Co., A. G., St. Louis, Mo.
Des Moines Stove Repair Co., Des Moines, Iowa
Northwestern Stove Repair Co., Chicago, Ill.
Peerless Fdry. Co., Indianapolis, Ind.

Ridging

Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Rings—Furnace Casing

Forest City Foundries Co., Cleveland, Ohio

Roof Flashing

Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Roofing—Iron and Steel

American Rolling Mill Co., Middletown, Ohio
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Newport Rolling Mill Co., The, Newport, N. Y.
Republic Steel Corp., Youngstown, Ohio

Roofing—Tin and Terne

Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Republic Steel Corp., Youngstown, Ohio

Rubbish Burners

Hart & Cooley Mfg. Co., Chicago, Ill.

School—Sheet Metal Pattern Drafting

St. Louis Technical Institute, St. Louis, Mo.

Schools—Warm Air Heating

St. Louis Technical Institute, St. Louis, Mo.

Screws—Hardened Metallic Drive

Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Parker-Kalon Corp., 200 Varick St., New York

Screws—Hardened Self-Tapping, Sheet Metal

Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Parker-Kalon Corp., New York

Screens—Perforated Metal

Chicago Perforating Co., Chicago, Ill.
Harrington & King Perforating Co., Chicago, Ill.

Scuppers

Aeolus Dickinson, Chicago, Ill.

Shears—Hand and Power

Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Niagara Mach. & Tool Wks., Buffalo, N. Y.
Viking Shear Co., Erie, Pa.
Yoder Co., The Cleveland, Ohio

Sheet Metal Screws—Hardened, Self-Tapping

Parker-Kalon Corp., New York

Sheets—Alloy

Inland Steel Co., Chicago, Ill.
International Nickel Co., New York, N. Y.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Republic Steel Corp., Youngstown, Ohio

Sheets—Aluminum

J. M. & L. A. Osborn Co., Cleveland, Ohio

Sheets—Black, Corrugated, Galvanized

American Rolling Mill Co., Middletown, Ohio
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
J. M. & L. A. Osborn Co., Cleveland, Ohio
Republic Steel Corp., Youngstown, O.

Sheets—Copper

American Brass Co., Waterbury, Conn.
Revere Copper & Brass Inc., Rome, N. Y.

Sheets—Copper Bearing Steel

American Rolling Mill Co., Middletown, Ohio
Granite City Steel Co., Granite City, Ill.
Gulf States Steel Co., Birmingham, Ala.
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
J. M. & L. A. Osborn Co., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio

Sheets—Copper (Lead Coated)

American Brass Co., Waterbury, Conn.
Revere Copper & Brass Inc., Rome, N. Y.

Sheets—Iron

American Rolling Mill Co., Middletown, Ohio
Granite City Steel Co., Granite City, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
J. M. & L. A. Osborn Co., Cleveland, Ohio
Republic Steel Corp., Youngstown, O.

Sheets—Monel Metal

International Nickel Co., New York

Sheets—Nickel

International Nickel Co., New York

Sheets—Pure Iron Copper Alloy

Newport Rolling Mill Co., Newport, Ky.

Sheets—Refined Open Hearth Iron

American Rolling Mill Co., Middletown, Ohio

Sheets—Special Finish

American Rolling Mill Co., Middletown, Ohio
Inland Steel Co., Chicago, Ill.
Newport Rolling Mill Co., Newport, Ky.
J. M. & L. A. Osborn Co., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio

Shingles and Tile—Metal

Globe Iron Roofing & Corrugated Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Skylights

Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Snow Guards

Berger Bros Co., Philadelphia, Pa.
David Levow, New York, N. Y.
Rival Strap Corp., New York, N. Y.

Solder

Kester Solder Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Solder—Acid Core

Kester Solder Co., Chicago, Ill.

Solder—Rosin Core

Kester Solder Co., Chicago, Ill.

Solder—Self-Fluxing

Kester Solder Co., Chicago, Ill.

Soldering Furnaces

Diener Mfg. Co., G. W., Chicago, Ill.

Soot Destroyer

Saginaw Salt Prod. Co., Saginaw, Mich.

Specialties—Hardware

Diener Mfg. Co., G. W., Chicago, Ill.

Stars—Hard Iron Cleaning

Fanner Mfg. Co., Cleveland, Ohio

Stove Pipe and Fittings

Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Stove and Furnace Trimmings

Fanner Mfg. Co., Cleveland, Ohio

Strainers—Roof

David Levow, New York, N. Y.
Rival Strap Corp., New York, N. Y.

Straps—Ornamental Pipe

David Levow, New York, N. Y.
Rival Strap Corp., New York, N. Y.

Tinplate

Granite City Steel Co., Granite City, Ill.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.
Republic Steel Corp., Youngstown, O.

Tools—Tinsmith's (See Machines—Tinsmith's)

Torches

Diener Mfg. Co., G. W., Chicago, Ill.

Trade Extension

Copper & Brass Research Assn., New York

Unit Air Conditioners

American Fdry. & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Andes Range & Furnace Corp., Geneva, N. Y.
Armstrong Furnace Co., Columbus, O.
Dail Steel Products Co., Lansing, Mich.
Fox Furnace Co., Elyria, Ohio
Henry Furnace & Fdry. Co., Cleveland, Ohio
Health-Air Systems, Ann Arbor, Mich.
Hess Warming & Ventilating Co., Chicago, Ill.
Lennox Furnace Co., Marshalltown, Iowa
May-Fiebeger Co., Newark, Ohio
Meyer Furnace Co., Peoria, Ill.
Midland Furnace Co., Columbus, Ohio
Motor Wheel Corp., Lansing, Mich.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Payne Furnace & Supply Co., Beverly Hills, Calif.
Richardson & Boynton Co., New York
Rudy Furnace Co., Dowagiac, Mich.
Thatcher Furnace Co., Newark, N. J.
Waterman-Waterbury Co., Minneapolis, Minn.
Williamson Furnace Co., Cincinnati, Ohio

Vacuum Cleaners—Furnace (See Furnace Cleaners)

Ventilators—Ceiling

Hart & Cooley Mfg. Co., Chicago, Ill.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Independent Reg. & Mfg. Co., Cleveland, Ohio

Ventilators—Floor

Aeolus Dickinson, Chicago, Ill.

Ventilators—Roof

Aeolus Dickinson, Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Burt Mfg. Co., Akron, Ohio
Jordan & Co., Paul R., Indianapolis, Ind.
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

Water Pressure Regulators

Apex Regulator Co., Marshalltown, Ia.

Wood Faces—Warm Air

Auer Register Co., Cleveland, Ohio
Milcor Steel Co., Mil., Canton, Chgo., LaCrosse, K. C.

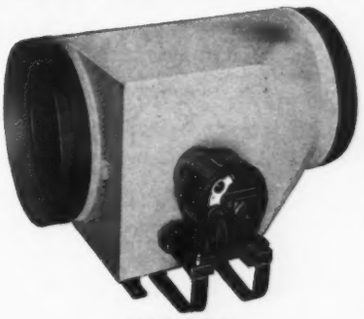
A Heat Hustler Fan Forces Air Through a Single Warm Air Pipe

Heats garages, sun porches and other rooms that will not heat by gravity. Mounts directly in the warm air pipe. Draws heat from the furnace and forces it into the hard-to-heat room. Quick heat for a bathroom.

Four reasons why you should use the American Heat Hustler:

1. It uses a positive pressure, rotary type fan.
2. Motor is outside the warm air flow, adding greatly to life of motor and leaving as much space for gravity air flow as before the Heat Hustler was installed.
3. It is quiet.
4. Furnished for either automatic or manual control.

Price list, with descriptive literature showing different models, sizes, etc., will be sent you by return mail upon receipt of your request. CLIP AND SEND THIS AD IN NOW!



PATENTED

AMERICAN FOUNDRY & FURNACE COMPANY

Bloomington, *World's largest manufacturers of blower furnace systems* **Illinois**

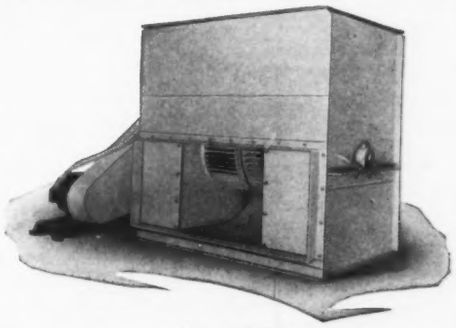
A FILTERED-AIRE BLOWER FORCES AIR TO ALL WARM AIR PIPES

Cleans the air and forces circulation.
Mounts at rear or at side of furnace.

Six reasons why you should use the Filtered-Aire Blower:

1. It is a multi-vane blower—the same type as used in big schools, churches, etc.
2. Ball bearings located outside air chamber.
3. By-pass damper automatically by-passes filters and blower for gravity circulation when fan is not running.
4. Four adjustable speeds—all quiet.
5. Rated by firepot diameter of furnace with which it is to be used. Technical ratings if desired.
6. Automatically controlled.

Price list, literature showing different models, sizes and full information for installing forced air jobs, wiring diagrams, etc., sent on request.



AMERICAN FOUNDRY & FURNACE CO.

BLOOMINGTON ILLINOIS Dept. AA

TIE UP

with these Important Conventions . . . .

January 25-28

National Association Sheet Metal Contractors; United Roofing Contractors; Roofing Division National Slate Association—Brown Hotel, Louisville, Ky.

January 25-29

International Heating and Ventilating Exposition—Public Auditorium, Cleveland, Ohio.

January 19-21

Indiana Sheet Metal and Warm Air Heating Contractors' Association—Antlers Hotel, Indianapolis.

All Reported in FEBRUARY 1st Issue of

AMERICAN ARTISAN

Reserve Space Now!

Have You

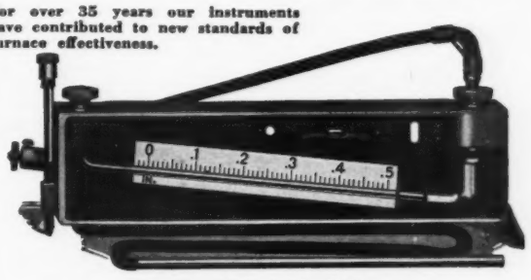
ELLISON DRAFT GAGES
The Entering Wedge To Boiler Room Efficiency

Seen The

New ELLISON PORTABLE DRAFT GAGE

This is the gage furnace men should use to determine the efficiency of the heating system. It shows precisely how much draft there is at any point tested.

For over 35 years our instruments have contributed to new standards of furnace effectiveness.



The New 35 Series Draft Gage

The Portable has a chromium plated removable steel cover which serves as a carrying case. The cover is removable and serves as a self-enclosed case in which are carried all fittings except the tubing. Easily carried in coat pocket as the dimensions over the cover of the ½" and 1" are 1⅛" x 2½" x 9⅜".

Let Us Tell You More About This New Gage. Write Today

ELLISON DRAFT GAGE COMPANY

214 West Kinzie Street Chicago, Illinois

Mention AMERICAN ARTISAN in your reply—Thank you!

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BUSINESS CHANCES

Lightning Rods—Dealers who are selling Lightning Protection will make money by writing to us for our latest Factory to Dealer Prices. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable and Fixtures are endorsed by the National Board of Fire Underwriters and hundreds of dealers. Write today for samples and prices. L. K. Diddle Company, Marshfield, Wis.

For Sale—Furnace and sheet metal shop in a good town in the dairy district in northern Illinois. Address O-544, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Ill.

PHILIP V. W. PECK
PATENT AND TRADE MARK LAW
Barrister Building, Washington, D. C.
Y-544

Wanted to Buy—Will buy for cash stocks of Registers, Furnaces and Pipe. Must be a good bargain. Address W-544, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

HELP WANTED

Wanted—Salesmen

We have a live proposition open for salesmen of ability who appreciate the real future of modern warm air heating and air conditioning. Our line represents individuality and efficiency and is complete in all details. Men must be of proven ability, have fine following with trade, and be in position to lay out and sell modern trunk line forced air work. Excellent territories open.

Dail Steel Products Company
Lansing, Mich. D-545

Furnace manufacturer has a proposition of real interest for a good furnace salesman for Chicago and adjacent territory, to call on retail trade. Commission basis insures an aggressive man making real money. Quality steel furnace line (coal, gas and oil burning) with a wide range of prices. All replies confidential.

Address L-544
AMERICAN ARTISAN
139 North Clark St., Chicago, Ill.

SALESMAN WANTED

to call on and sell to dealers in Chicago area (make Cook and Will Counties, Illinois, and Lake County, Indiana) with a complete line of high grade steel furnaces for quality as well as competitive jobs, including oil and gas furnaces. Resident of Chicago preferred. Liberal commission proposition.

Address in Confidence
MEYER FURNACE CO.
Peoria, Ill.
K-544

HELP WANTED

Wanted—Experienced furnace salesmen for the territory of Illinois and Wisconsin for an old, established trade mark line of furnaces. Address G-544, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

SITUATION WANTED

Situation Wanted—As West Coast territory salesman for a reputable manufacturer. Can furnish best of references. For full particulars write F-544, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Sales and Advertising Manager

well-known in the industry and to the trade, seeks new connection with manufacturer who is interested in developing air conditioning equipment.

Broad and productive experience in all lines of heating engineering, including adaptation of refrigeration in connection with forced warm air heating systems.

Have designed several air conditioning units, and improvements in warm air furnace construction.

Member A. S. H. & V. E., A. S. M. E. Twelve years with present company

Address R-543
AMERICAN ARTISAN
139 North Clark Street Chicago, Ill.

Situation Wanted—Heating engineer, well known in the industry, with experience in sales promotion and advertising, desires connection with firm interested in developing air conditioning equipment. Excellent training, broad experience, best of references, and a record that will stand investigation. Address B-545, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By first class sheet metal worker. Can layout and estimate large or small work. Long experience in Government detail, indirect heat, fan systems, and ventilating. 40 years old. Will go anywhere. Address X-544, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By a sheet metal and furnace man Can also do plumbing. Any reasonable offer will be accepted. Can come any time. Address W. H. Parker, 402 Pennsylvania Avenue, Abington, Illinois. Z-544

Situation Wanted—By first class sheet metal worker. Experienced in shop work, pattern drafting, skylight, ventilating, air conditioning, blow pipe and all outside work, both in the making and erecting. Best of references. Married, sober, and reliable. Would like good year round proposition if possible in Iowa or southern Minnesota. Address A-545, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

SITUATION WANTED

Situation Wanted—By an experienced hardware clerk and salesman. Would like to make a change with some good hardware firm by March 1st. Wisconsin preferred. Address R-544, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By a first class plumber, steam fitter and sheet metal worker. Good worker. Can furnish best of references. West or North West preferred. Address J. J Herlick, Box 473, Harvey, North Dakota. S-544

Situation Wanted—By practical sheet metal and furnace man. Experienced in gravity and conditioned air. Have complete knowledge of layout, estimating and sales. Would like to make a connection with some reliable firm. Can locate anywhere. T-544, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Ill.

Situation Wanted—By all around Scandinavian tinner and furnace man Have had some business experience. Prefer Minnesota, Iowa, or Nebraska. Address C-545, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—A good tinner, plumber, fitter and repair man wants to run shop on commission or commission and small wages, with privilege to rent or buy later. Please state particulars. Am middle aged and married. West of Mississippi river preferred. Address F-545, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—Have had 28 years experience as tinner and plumber. Am qualified to do work in the following lines: auto radiator repairing, erecting steel ceilings, pump and windmill repairing, steam and hot water work, installing radios, and any kind of mechanical job that comes in a shop. Can give good references. Address G-545, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Ill.

Situation Wanted—Good sheet metal man and plumber now open for good job. A-1 references. Married. Will go any place. Address M-544, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

TOOLS AND MACHINERY

For Sale—Complete set of tinners' tools, including one 8 foot Robinson brake. A complete list will be furnished on request. Address W. H. Werbe, 204 South Union Street, Kokomo, Indiana. P-544

Must Sell—Good used suction furnace cleaner mounted on trailer, complete with 38 inch fan, Dodge motor, 50 feet suction tubing, and 600 square foot bag. For immediate sale, $375.00. Address H. Cain, Rossville, Illinois. E-545

PREPARE NOW
For 1932-33, etc.

The INSTITUTE is at your Service with specialized Courses of Training, listed below. We have major as well as short courses; all are like private instruction, confidential; moderate in cost, and big in producing results—making money for you. This is our 22nd year, and warrants your perfect trust and confidence in our business and Training methods.

THIS IS YOUR ONE BIG OPPORTUNITY

Enroll for one of our Courses of Training and develop larger opportunities of service, advancement, etc. Check the Course you prefer—write today. Full information is free—no obligation.

- ☐ Sheet Metal Design and Pattern Drafting.
- ☐ Specialized Short Sheet Metal Courses.
- ☐ Heating Ventilating Engineering.
- ☐ Special Warm Air and Forced Air Heating.
- ☐ Air Conditioning for..Fan H. & V. Eng.
- ☐ Contracting and Estimating.

THE ST. LOUIS TECHNICAL INSTITUTE 4543 CLAYTON AVE. ST. LOUIS, MO.

Perforated Metals *for every requirement*

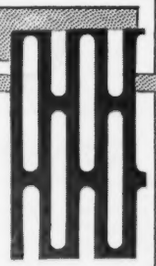
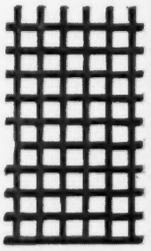
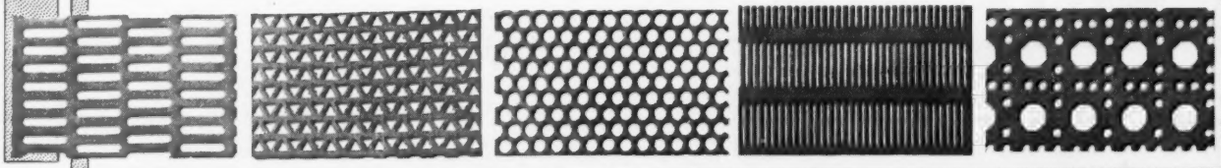
Steel, Brass, Bronze, Copper, Monel
Aluminum, Stainless Iron, Zinc
or any other metal

PERFORATED TO YOUR ORDER

Round holes from .020" to 7" Diam.
Oblong and Slot holes from .008" to 3" wide.

Grilles of distinction for fine buildings

Everything in Perforated Metal

THE HARRINGTON & KING PERFORATING CO.

5649 FILLMORE ST., CHICAGO, ILL., U. S. A. NEW YORK OFFICE, 114 LIBERTY ST.

"BB"

The mark of quality on sheet metal and roofers' supplies

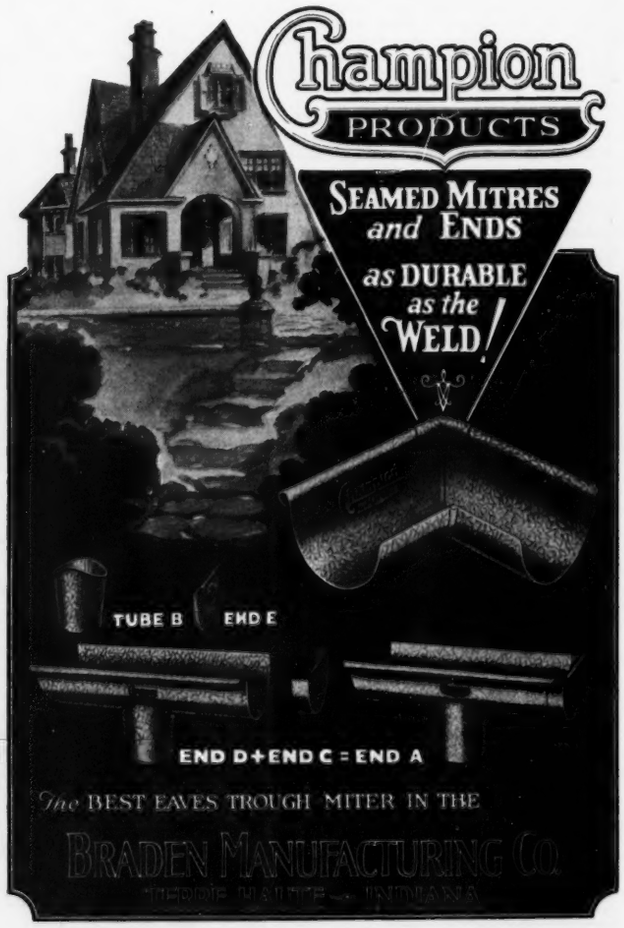
BERGER BROTHERS CO.

229-237 ARCH STREET, PHILADELPHIA, PA.

EAVES TROUGH
GUTTER HANGERS
CONDUCTOR PIPE
CONDUCTOR FASTENERS
MITRES
END PIECES AND CAPS
CONDUCTOR HEADS
ORNAMENTAL STRAPS
VENTILATORS, ETC.

Champion PRODUCTS

SEAMED MITRES *and* ENDS *as* DURABLE *as the* WELD!



The BEST EAVES TROUGH MITER IN THE

BRADEN MANUFACTURING CO.

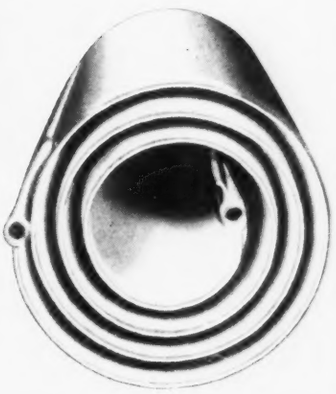
TERRE HAUTE — INDIANA

Say you saw it in AMERICAN ARTISAN—Thank you!

1932

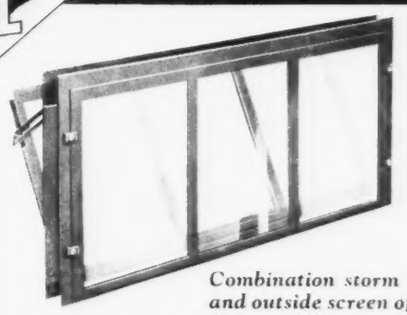
Lower Cost Per Year of Life

WHEREVER THERE IS MOIST AIR.. INDOORS OR OUT



Side and bottom views of spiral radiator made of Inland Copper-Alloy Steel Sheets.

INLAND COPPER ALLOY STEEL



Combination storm window and outside screen of Inland Copper-Alloy Steel Sheets.

UNBIASED tests by scientists have proved conclusively that copper-bearing steel sheets endure longer under atmospheric corrosion.

Wherever corrosion is a problem or wherever permanence is an aim, the little added cost for Inland Copper-Alloy brings big returns. The cost is very LITTLE MORE than for ordinary commercial grades . . . and LESS THAN FOR ANY OTHER CORROSION-RESISTING METAL

Inland Copper-Alloy is not limited to sheets. Any Inland product is promptly available made of Inland Copper-Alloy Steel.

It is the logical material for anything which must endure . . . outdoors or in . . . for heating or ventilating systems, exposed machine parts, roofs, siding, tanks, and dozens of other uses. INLAND STEEL COMPANY, 38 So. Dearborn St., Chicago.

American Society for Testing Materials says:

Iron and Steel sheets have been ranked according to rust and corrosion resistance under atmospheric conditions by the American Society for Testing Materials—ranking based on tests at Fort Sheridan, Annapolis, and Pittsburgh. Copper-bearing Steel Sheets lead the list.

INLAND STEEL

ABLE SERVANT OF THE CENTRAL WEST

Sheets Strip Plates
Bands Structurals Piling

Rails Track Accessories
Bars Rivets Billets

Keep a Step Ahead in Your Community!

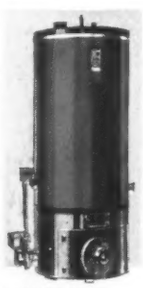
With an oil-burning "Weather Control" Unit that Warms in Winter — Cools in Summer

The modern **MW** "Weather Control" Unit brings in those hard-to-please customers—builds profitable business.

Can be installed with the present hot-air system between the walls; cuts down pipes in the basement. The **MW** "Weather Control" is a matched unit combining combustion chamber, oil burner, thermostatic control, humidifier, air-circulating blower, all built together.

This Unit is quiet, automatic and economical. Actually it makes 5 gallons of oil do the work of 8. The burner, with its super oil flame, being ***matched*** to the combustion chamber, gives vastly superior results than if the burner were simply stuck into an ordinary furnace.

The welded steel combustion chamber of the **MW** "Weather Control" is enclosed in a double outer casing. This insulation prevents loss of heat and keeps the outer casing cool. Thus it is possible to lacquer the new "Weather Control" Unit in attractive colors.



MW Boiler Unit

This MW Oil-Burning All-Steel Boiler Unit —for hot water or steam heat—is amazingly efficient because it's a *matched* unit. Both the boiler and the burner are designed to operate together by Motor Wheel Corporation. Thermostatically controlled and extremely quiet. Listed as Standard by the Underwriters' Laboratories.

Get the Facts on the **MW** *Franchise Plan Now!*

There are still a few franchises open. This plan is very popular—so we urge you to move quickly. The plan includes the **MW** Purchase Plan. Just write for details.

The **MW** "Weather Control" Unit is listed as Standard by the Underwriters' Laboratories.

MW Water Heater

The MW Oil-Burning Water Heater gives an inexhaustible supply of hot water at a heating cost of only 1-20th of a cent a gallon. This MW Oil-Burning Water Heater is automatic and thermostatically controlled. And it's noiseless, with not a single moving part. Listed as Standard by the Underwriters' Laboratories.

MW WEATHER CONTROL

(manufactured by MOTOR WHEEL CORPORATION, Heater Division, Lansing, Michigan)